CITY OF ARVIN

2019 SEWER MASTER PLAN
VOLUME 2 - APPENDICES

Harris & Associates.

VEOLIA

2019 SEWER MASTER PLAN
FOR THE
CITY OF ARVIN

APPENDICES

Acknowledgements

The Sewer Master Plan was prepared by Harris and Associate, Inc.

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In association with Veolia North America

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And with assistance from the City of Arvin

- R. Jerry Breckinridge – City Manager
- Jeffrey Jones – City Finance Director
- Adam Ojeda, PE – City Engineer
- Mitzy Cuxum – City Planner

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Appendix A: Hydraulic Model Construction and Calibration

Hydraulic Model

The hydraulic model is a computer simulation of all pipelines in the collection system 10 inches in diameter or larger. It was constructed using SewerGEMS software by Bentley.

The hydraulic model is the primary tool used to determine capacity of the wastewater collection system. Pipelines found to have insufficient capacity are recommended for mitigation.

The hydraulic model consists primarily of nodes (i.e. manholes) and links (i.e. pipes between manholes). The pump station is also modeled as a series of nodes (i.e. a sump, two pumps and a point of discharge) with interconnecting links (i.e. pressurized pipes). The computer uses Manning's Equation to calculate a solution for the entire system by determining the flow and depth in every pipe based on applied wastewater generation rates.

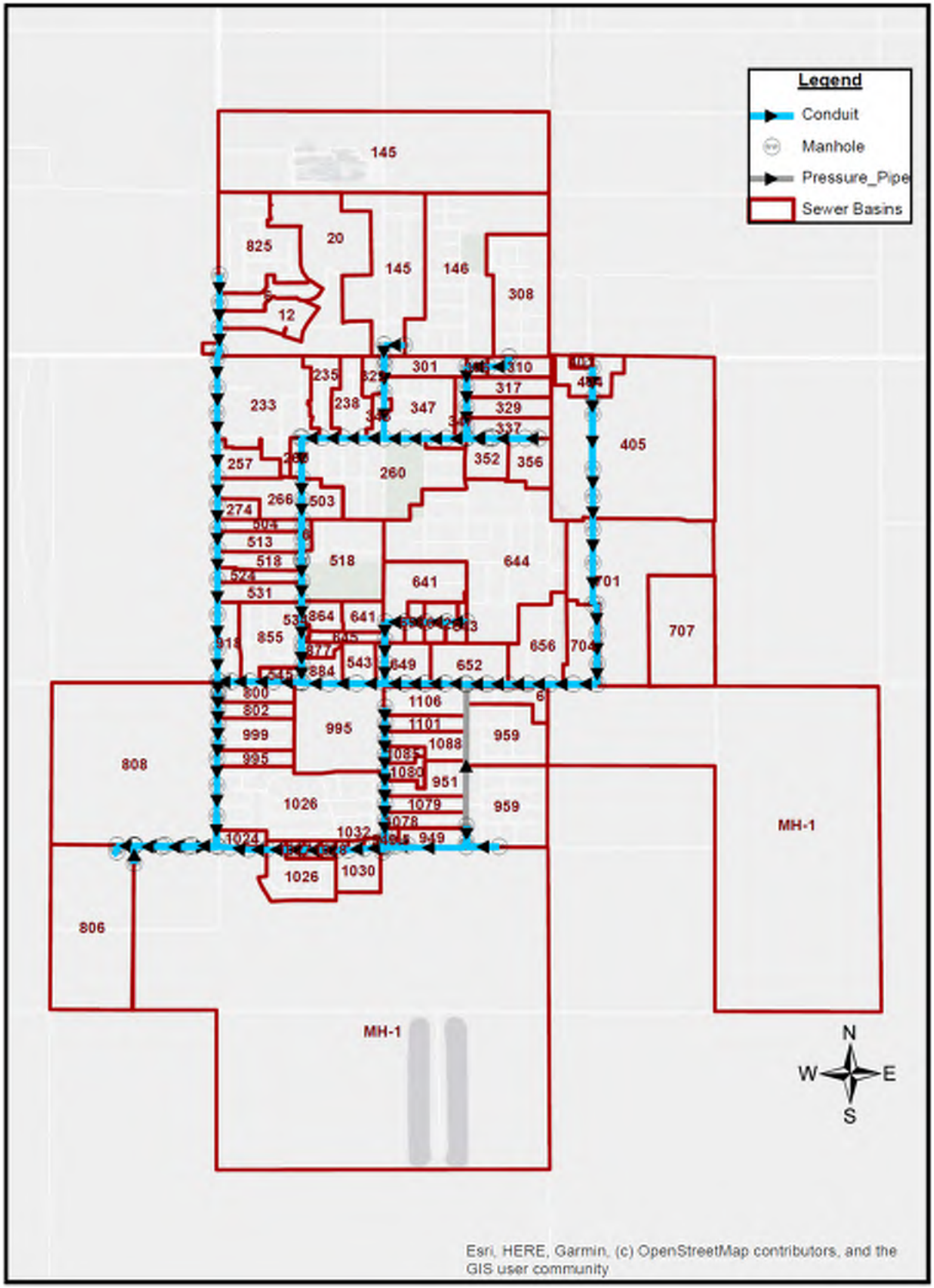
The hydraulic model was originally constructed and calibrated to 2010 conditions.

To prepare the model for current and build out conditions, current and future wastewater generation conditions were allocated based an application of the wastewater generation factors presented Chapter 5 of the report.

Flow is allocated by sewer basin. A sewer basin is a tributary area associated with a manhole. For modeling purposes, wastewater generation by tributary area is allocated as flow in units of gallons per day to the appropriate manhole.

The figure on the next page shows the hydraulic model and the sewer basins used for model loading.

Sewer Basins



Four flow allocations were prepared for this Sewer Master Plan for evaluation of the design criteria presented in §5.2 of the report:

- Existing Average Flow

  Existing Average Flow is the average wastewater generation based on current land use occupancy and allocated via the sewer basins to the model. This allocation is used to verify the minimum pipe velocity constraint under existing conditions.

- Existing Peak Flow

  Existing Peak Flow is the Existing Average Flow increased by a peaking factor of 1.8. This allocation is used to verify the maximum pipe velocity constraint and the maximum pipe depth to diameter ratio under existing conditions.

- Build-Out Average Flow

  Build-Out Average Flow is the average wastewater generation based on complete occupancy of existing land use at the highest allowable density and allocated via the sewer basins to the model. This allocation is used to verify the minimum pipe velocity constraint through build-out.

- Build-Out Peak Flow

  Build-Out Peak Flow is the Build-Out Average Flow increased by a peaking factor of 1.8. This allocation is used to verify the maximum pipe velocity constraint and the maximum pipe depth to diameter ratio through build-out.

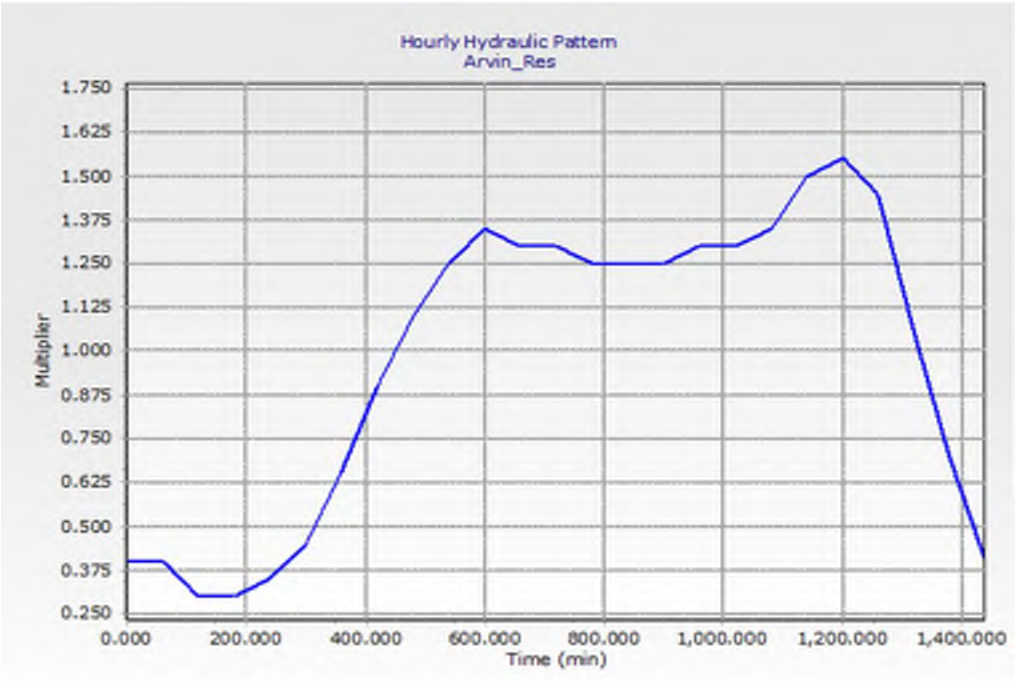
At each manhole, a diurnal curve was applied to the wastewater generation allocation to capture the impacts of flow variation and attenuation.

A diurnal curve is a repeating pattern that describes the typical changes in wastewater generation intensity at different times of day. For example:

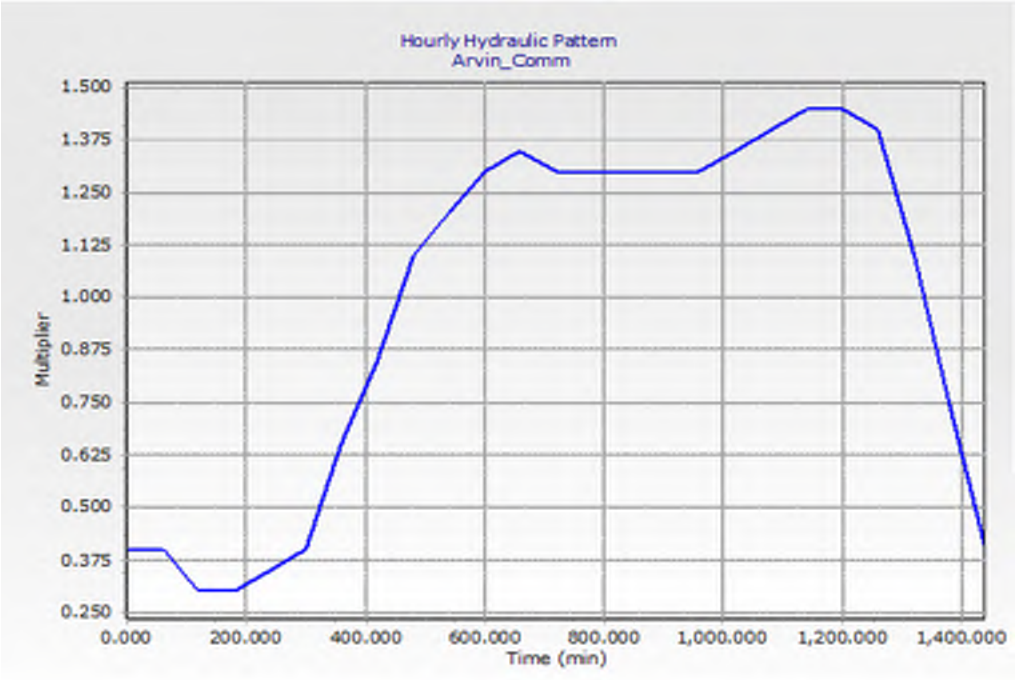
- During the night when customers are sleeping, wastewater generation tends to be very low
- In the morning, wastewater generation tends to spike as customers wake up and prepare for the day.
- Wastewater generation tends to be constant during the work/school day.
- In the evening, wastewater generation tends to spike as customers return home.

One of two diurnal curves was applied at each manhole based on the nature of the flow: The figures below show the residential diurnal curve and the commercial / industrial / institutional diurnal curve.

Residential Diurnal Curve



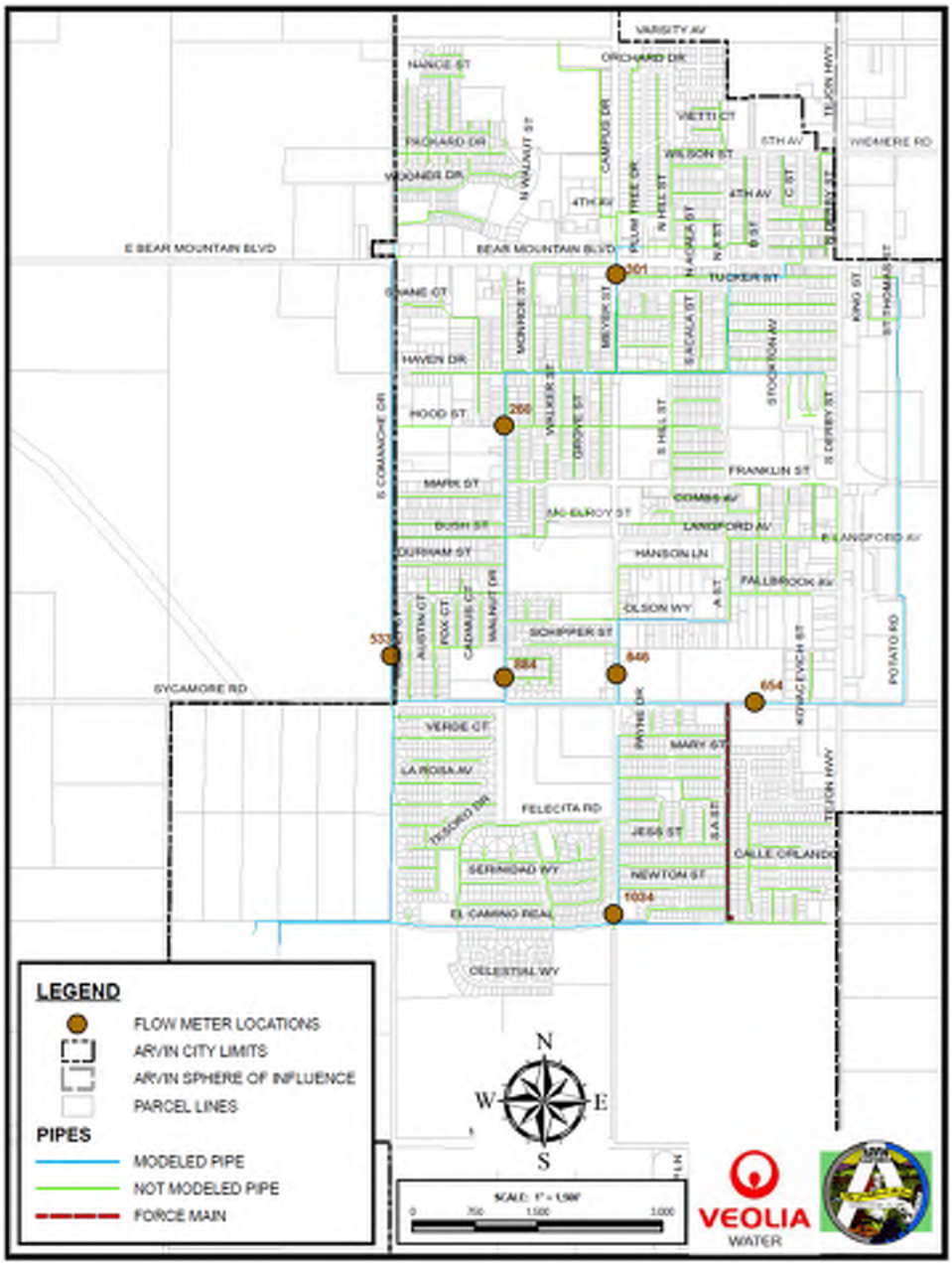
Commercial / Industrial / Institutional Diurnal Curve



FLOW METERING AND MODEL CALIBRATION

Meter Locations

Seven flow metering locations and two rain gauge locations were selected for flow analysis and model calibration, as shown in the figure below.



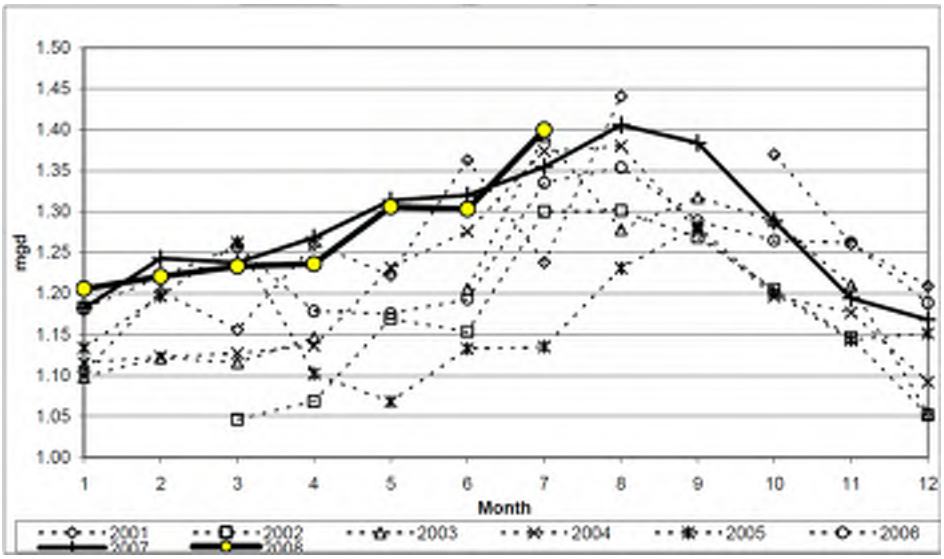
The selections were made for the purpose of isolating various areas of common land use. Flows were metered at the seven sites by SFE Global, for the period from January 28 2009 through April 7, 2009 at five minute reporting intervals. The metering period was timed to capture the wet season.

Historic Flow to Treatment Plant

Headworks inflow is not directly metered at the Wastewater Treatment Plant, but a monthly estimate of inflows is made based on the headworks process flow meters. The table and figure present the findings over the period from 2001 through 2008.

	mgd	mgd	mgd	mgd	mgd	mgd	mgd	mgd
Month	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
January	1.104	1.183	1.096	1.116	1.134	1.181	1.182	1.206
February	1.203		1.122	1.123	1.197	1.220	1.243	1.221
March	1.156	1.047	1.116	1.127	1.262	1.258	1.238	1.233
April	1.260	1.068	1.147	1.136	1.102	1.179	1.268	1.237
May	1.222	1.170		1.232	1.068	1.176	1.314	1.306
June	1.363	1.154	1.206	1.276	1.133	1.193	1.320	1.303
July	1.238	1.300	1.392	1.374	1.135	1.335	1.356	1.400
August	1.441	1.301	1.278	1.380	1.231	1.354	1.406	
September		1.269	1.318	1.276	1.282	1.289	1.384	
October	1.370	1.205	1.289	1.196	1.201	1.265	1.289	
November	1.261	1.147	1.210	1.177	1.144	1.262	1.194	
December	1.209	1.052	1.054	1.092	1.152	1.189	1.168	
Minimum	1.104	1.047	1.054	1.092	1.068	1.176	1.168	1.206
Maximum	1.441	1.301	1.392	1.380	1.282	1.354	1.406	1.400
Average	1.257	1.172	1.203	1.209	1.170	1.242	1.280	1.272

Notes: Peak Monthly Average Flow of 1.4 mgd occurs in summer. A 10% to 25% drop occurs annually in the winter rainy season.



The plant inflows demonstrate that average monthly flows peak in or around August at approximately 1.4 mgd. The highest monthly average flow does not correspond with the peak rainfall season. The summer peak is thought to correspond with Arvin's population and irrigation levels that peak in the summer months.

Inflow and Infiltration Analysis

There were several rainfall events during the metering period that captured 1.16 inches and 1.26 inches of rainfall at the two rain gauges over the monitoring period. The flow meters did not show a discernable rainfall response. This is consistent with staff input that the collection system and plant flows are not affected by wet weather events. Based on these findings, Inflow and Infiltration (I&I) is not considered to be a driver of peak flows in the Arvin Collection System

The lack of a wet weather response may in part be due to the deep groundwater table, and may in part be due to much of the system being constructed of tightly jointed PVC. The City is within a floodplain, however, so extreme events may add significant contributions to flows in those rare flooding events. There is inadequate data at this time to quantify these speculative contributions.

Because I&I is not evident, a conservative approach to model calibration was used to estimate Peak Dry Weather Flows (PDWF) in the system for the capacity analysis and sizing of upgrades.

Model Calibration

A flow model is calibrated by adjusting the diurnal curve and loading factors until the simulation matches observed data. The calibrated model is then loaded with future flow loads to project future flow characteristics.

For calibration of the Arvin model, the five minute meter data was analyzed, outlier periods were removed, and the average daily five minute flows for the metering duration between January 28 2009 and April 7, 2009 were used as the calibration target.

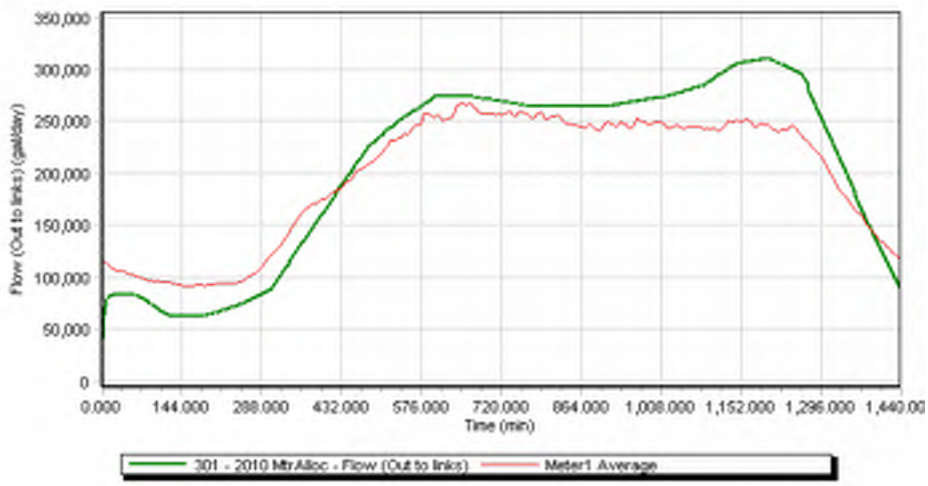
Adjustments were made to the flow loading factors, the unit diurnal curve, and individual parcel flows, until the modeled flows most nearly matched observed flows. The calibrated model was then used to project future flow patterns.

The results of the model calibration are summarized in the table below.

Meter	Comparison	Flow (mgd)		Difference	
		Measured	Modeled	(mgd)	(%)
1	Average	0.198	0.206	0.008	4.0%
	Maximum	0.267	0.311	0.044	16.5%
	St. Dev. of 5-minute Readings			0.026	14.0%
2	Average	0.595	0.627	0.032	5.4%
	Maximum	0.834	0.957	0.123	14.7%
	St. Dev. of 5-minute Readings			0.077	13.7%
3	Average	0.028	0.069	0.041	146.4%
	Maximum	0.037	0.099	0.062	167.6%
	St. Dev. of 5-minute Readings			0.011	36.9%
4	Average	0.141	0.159	0.018	12.8%
	Maximum	0.206	0.243	0.037	18.0%
	St. Dev. of 5-minute Readings			0.022	16.6%
5	Average	0.816	0.787	-0.029	-3.6%
	Maximum	1.175	1.203	0.028	2.4%
	St. Dev. of 5-minute Readings			0.026	14.2%
6	Average	0.116	0.153	0.037	31.9%
	Maximum	0.178	0.236	0.058	32.6%
	St. Dev. of 5-minute Readings			0.023	21.7%
7	Average	0.093	0.126	0.033	35.5%
	Maximum	0.154	0.193	0.039	25.3%
	St. Dev. of 5-minute Readings			0.022	26.7%

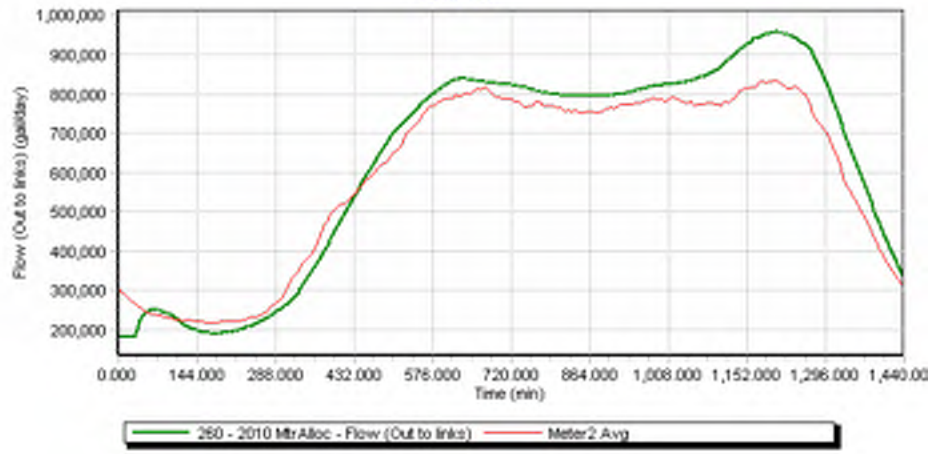
Meter 1 Calibration

Meter 1 was located at manhole 301 on Campus Drive just South of Bear Mountain Boulevard. The location captures flow from Arvin High School, Single Family Homes, and a mix of commercial and residential development. The peak flows occur in the middle of the day, staying relatively flat from 9:00 am to 9:00 pm. The calibrated mid-day flows are above the measured average flows and overall matches within approximately one standard deviation from the mean.



Meter 2 Calibration

Meter 2 was located at manhole 260, located at the intersection of Hood Street and Walnut Drive. The location captures flow from meter 1, and the area generally North of Haven Drive and east of Walnut Drive, with the exception of flows from Basin 71, which flow to Comanche. The additional area is predominantly residential, but also includes the commercial areas along Bear Mountain Boulevard and along Haven Drive. The increase in residential flows produces a slightly increased afternoon peak. The modeled flow is above the average measured flow, but within one standard deviation from the mean.



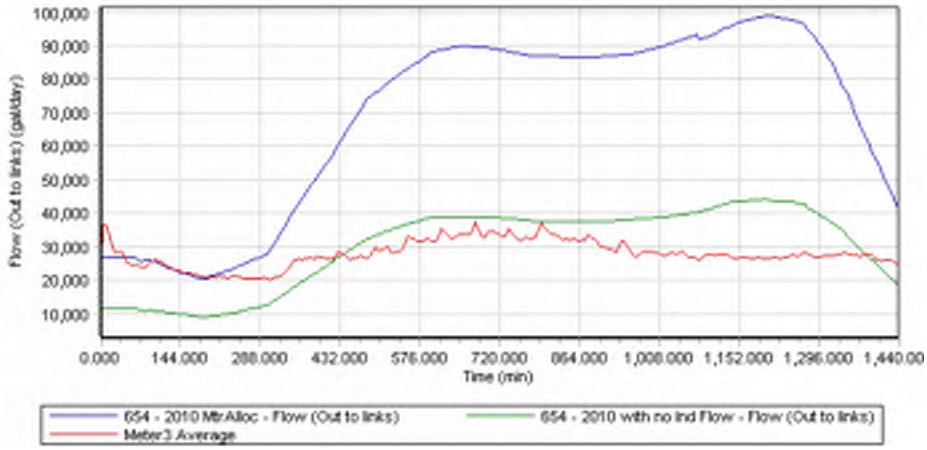
Meter 3 Calibration

Meter 3 was located at manhole 654 on Sycamore Road east of A Street. The tributary area is primarily the industrial area between Derby Street and along Potato Road, but includes some residential and commercial area near Bear Mountain Boulevard. Modeled flows were difficult to calibrate, but a successful calibration was achieved.

Considerable effort was spent confirming connections, confirming occupancy, adjusting flow factors, and adjusting unit curves. Based on connection records and interviews with Veolia Water staff, the model was corrected to show that some large industrial agricultural users have installed water reuse and onsite treatment and disposal systems that reduce or eliminate sewer flows. Finally, a sensitivity analysis to industrial flow factors was performed by setting the industrial flows to zero. The calibration plot shows this scenario along with the results using the systemwide calibrated flow factors for industrial discharge and other uses.

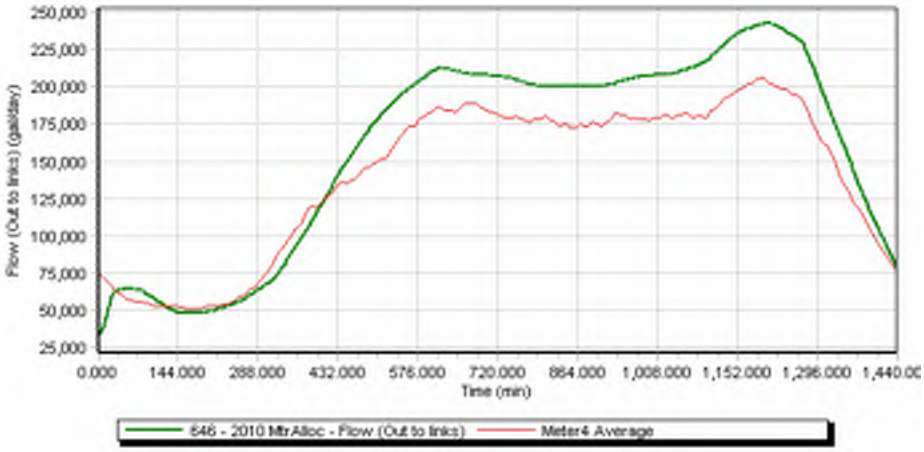
The analysis shows that industrial flow accounts for roughly half of the modeled volume at meter 3. Modeled flows are 50 percent to 73 percent above the measured flows at this location. The non-industrial flows are still above measured flows by up approximately 40 percent. The shape of the observed diurnal curve is unusual. Measured peak discharges occur at midnight and noon, unlike the peaks at any other meter. Measured results also show oscillations that are apparently due to surge discharge from the A Street Pump Station outfall manhole number 653 approximately 330 feet to the west. The pump station surges, low slopes, and shallow flow depths cause a backwater influence on flows and meter reads, leading to the observed erratic flow conditions.

Sewer users within the Meter 3 area are not restricted to the relatively low flows observed during the metering period. These users are capable of increasing flow volumes and timing without notice and it is unlikely that future industry would be restricted to the low flow production rates observed today. The modeling results are considered to be a reasonable approximation of flow conditions that could occur at any time, and therefore, meter 3 is calibrated for the purpose of analyzing existing and future capacity.



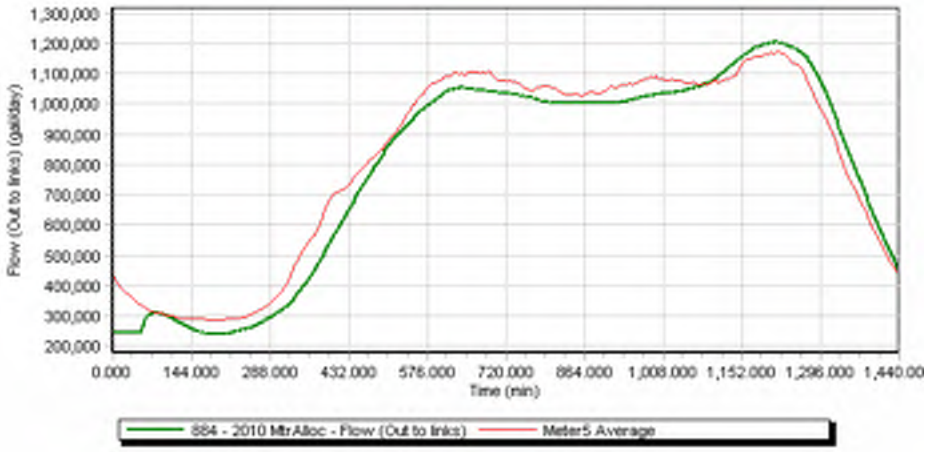
Meter 4 Calibration

Meter 4 was located at manhole 646 on Meyer Street North of Sycamore Road. Meter 4 captures primarily residential flows from the area roughly between Meyer Street, Derby Street, Sycamore Road, and Fabian Street, two blocks North of Franklin Street. Meter 4 calibration results are above the average metered flows by roughly one standard deviation from the mean.



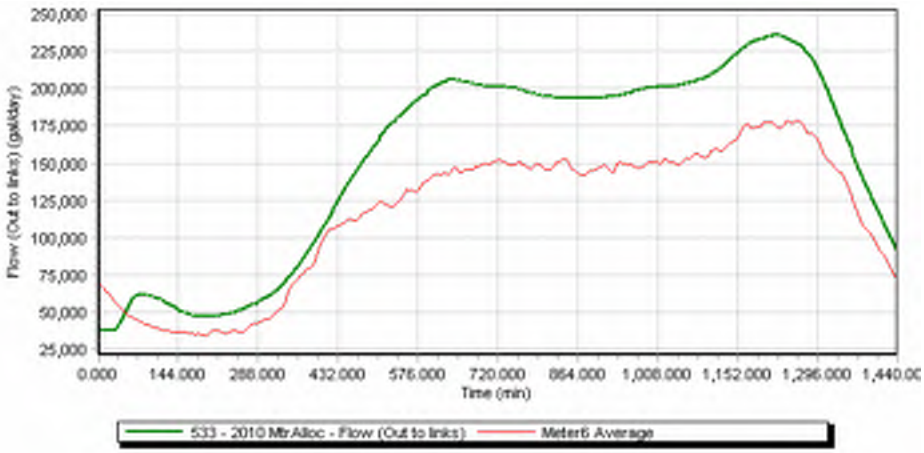
Meter 5 Calibration

Meter 5 was located on Walnut Drive just North of Sycamore Road. Meter 5 collects flows from Meter 2, with the addition of residential flows with some apartment and park flows along Walnut Drive roughly between Comanche Drive and Meyer Street. The additional flows increase the peak discharge from roughly 0.825 mgd at meter 2 to 1.15 mgd at meter 5. Results show that meter 5 modeled results are within five percent of the measured results and approximately 1/3 of a standard deviation from the mean.



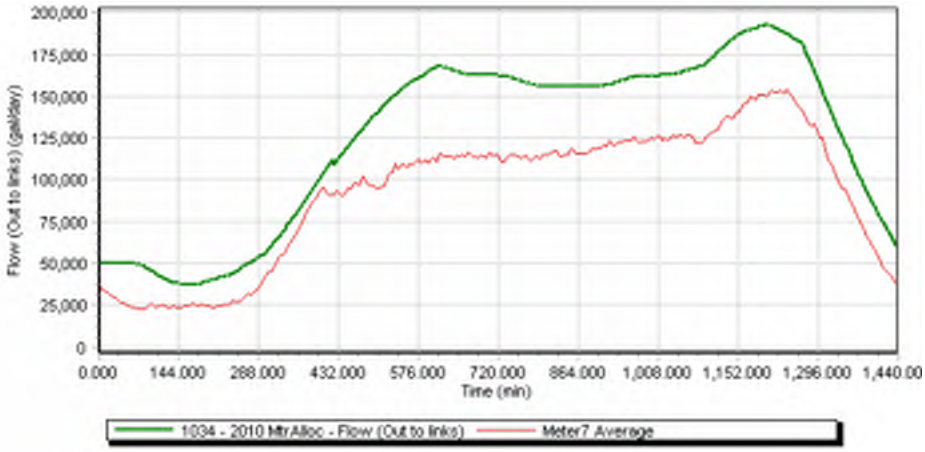
Meter 6 Calibration

Meter 6 was located at manhole 533 on Comanche Drive just North of Sycamore Road. The location collects a mix of residential flow and commercial flow south of Bear Mountain Boulevard and includes flows from a portion of Bear Mountain Elementary School. A large portion of the area flowing to Meter 6 is slated for redevelopment and future Planned Unit Development. Individual parcels were analyzed and adjustments were made. The shape of the curve is a near match. Calculated flows exceed measured flows by approximately 1.5 standard deviations from the mean.



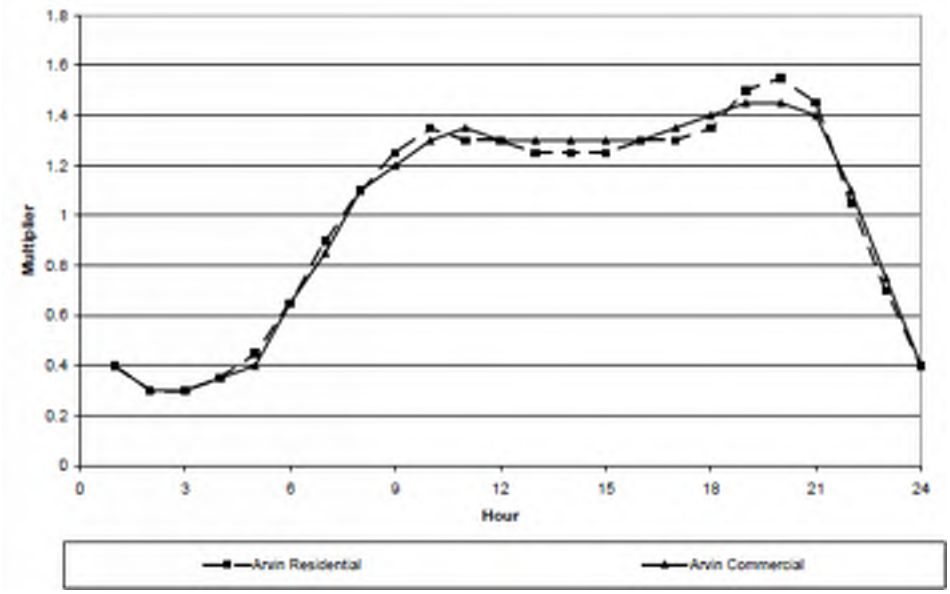
Meter 7 Calibration

Meter 7 was located at manhole 1034, on Meyer Street, just North of El Camino Real. The location collects flow from the built-out residential development between El Camino Real, Sycamore Road, Meyer Street, and A Street. The model data is approximately 1.5 standard deviations from the mean in this area.



Unit Diurnal Curves

Unit Diurnal curves are used to multiply the flow loads at each time step as they are entered into the model calculations. Calibration involved the development of two unit diurnal curves: one for residential areas, and one for commercial / industrial areas, as shown below.



The curves do not show extreme morning and afternoon peaks, and they are very similar in appearance. The peak attenuation is attributed to the size of the initial sewer collection areas. Since only 25 percent of the system was included in the hydraulic analysis, the sewer basins are relatively large, and flows are attenuated by routing as the curve shape demonstrates.

Appendix B: Pump Station Inspection

Harris & Associates

MEMORANDUM

To: File
From: Gail Masutani
RE: Arvin Lift Station Inspection Report
Date: March 29, 2019
CC: Tony Herda, Harris & Associates

Inspection Purpose

Harris & Associates is updating the City of Arvin's Sanitary Sewer Management Plan. The inspection and assessment of the Arvin Sewer Lift Station, located at 2508 South A Street (NE corner of the intersection of A Street and El Camino Real). See Figure 1 of Attachment A. The inspection was conducted on March 27, 2019 at 10:00-11:30. The weather was sunny and temperature was approximately 75 degrees F. Mr. Dale Ducharme met me at the at lift station.

Pump Station Background

The pump station construction was completed in late 2005 and consists of two submersible pumps in a 6-feet diameter manhole wet well with a depth of approximately 17.7 feet. A double door aluminum hatch, 6' x 4', covers the wet well. The hatch is rated for H20 non-traffic area loading. The pumps are guided on stainless steel rails extending from the pump base to the top of the wet well. According to the as-builts the discharge piping is 4-inch ductile iron. Depicted in Figure 2 is the overall site plan. Foreground hatch is for the vault.

The two pumps are submersible, non-clog pumps by Fairbanks Morse model 4" 5433mvK. Per the submittal information, each motor is 10 hp, 1200 rpm, 3 phase, 60 hertz, and 480 Volts, with motor frame 210. The pumping design point is 270 gpm @ 49 feet total dynamic head (TDH). According to Mr. Ducharme, one pump was replaced in October 2013 and the other was replaced in late 2014. Both pump failures were due to electrical issues.

The pump/motor controls are housed in above-grade 60" x 60" stainless steel cabinet (see Figure 3). A generator hookup port and transformer box is located outside of the electrical control cabinet for emergency power (see Figue 3A). A red light alarm sits on top of the cabinet.

A Pacific Gas and Electric (PG&E) meter box (see Figure 3B) sits adjacent to the pump/motor control panel and a telecom box (see Figure 3C) is located on the opposite side of the pump control center.

A cast-in-place valve vault, interior dimensions 5'8" x 5'8", is located adjacent to the wet well and houses swing-lever check valves, isolation plug valves, and flange adapters (see Figure 4). The vault is approximately 9.2 feet deep. A double door aluminum hatch, 6'x4', covers the vault. The hatch is rated for H20 non-traffic area loading.

Leaves on both hatches have "DANGER - Confined Space Entry By Permit Only" placards (see Figure 5)

Downstream of the vault is an above grade sewer cleanout which is connected to the force main. The cleanout was added to facilitate emergency pumping. A spare submersible pump is dropped into the wet well and flow is discharged into force main via the sewer cleanout.

A ventilation fan blows air into the wet well. The blower provides 1900 ACFM at 1.5" WC with 1.5 HP. The motor is one phase, 60 hertz, and 230 volts. Fiberglass ducting directs the flow into the wet well. Two 8-inch PVC/steel vent piping exhausts the wet well air into two 5-gallon buckets filled with activated carbon for odor control.

Inspection Observations

General Observations

- A pump station inspection checklist, attached as Exhibit B, indicates the items reviewed.
- The pump station site is very clean with no on-site trash. Gravel covers the entire site and was graded to promote off-site water runoff.
- The fencing appeared be new with dark brown slats.

Wet Well

- The wet well liner is lined with bitumastic paint and is in good shape. There are a few areas where the liner appears to have been scraped, exposing the concrete (see Figures 7 and 8). The exposed concrete did not have pitting or exposed aggregate, indicating low hydrogen sulfide in the off-gas.
- A 1-inch sand grout was seen around all penetrations. The grout, mounded to the wall, did not show deterioration (see Figure 9).
- The piping in the wet well is ductile iron with some signs that the coating may be deteriorating. High pressure washing of the piping will remove scum and provide a better condition assessment of coating (see Figure 10).
- The stainless steel pump rails are in good condition with no evidence of rut, rails were straight, and unscratched (see Figure 11).
- The aluminum hatch shows signs of wear. Although the aluminum is pitted, the hatch opens easily and the spring-operator appears to work well. See Figure 11A.

Pump Operation and SCADA

- The pumps are Fairbanks Morse submersible, non-clog pumps. Both pumps were pulled from the wet well (see Figure 12). Pump #1 was having increased pump run time due to clogging. A mass of rags was pulled from the pump volute (see Figure 12A). Pump 2 was pulled for inspection and the volute was clear. Other than the cleaning, the pumps appeared to be in good working order.
- The pumps appear to slid easily up and down the pump rails due to the lack of metallic rubbing sounds. The pumps seated without complication when lowered to the pump discharge elbows. See Figure 13.
- According to the shop drawing pump submittal, the pump coating is bitumastic 300 epoxy with a dry film thickness of 8 mils. The pump coating appeared to be in good condition. See Figure 14.
- Pump calls are based on wet well level which was monitored with a submersible level transducer at the bottom of the wet well. Back up mercury float switches are tested once per month by running the pumps only on float control (see Figure 15). The level transducer was replaced in February 2013.
- The lift chains from the pumps are encased in plastic and are neatly coiled at the top of the wet well. See Figure 16.

- When the pump station was installed, a telecom line was used to relay the programmable logic controller (PLC) signals to the wastewater treatment plant.
- The pump station has a SCADA antenna (see Figure 17), however, there is only one signal to the wastewater treatment plant. The signal is for pump fail/high water level. An operator is sent to the lift station to determine the cause of the fail signal. The only way loss of power is signaled to the wastewater treatment plant is when the signal is lost.

Ventilation Fan

- The ventilation fan housing appears to be in good condition. The paint does not show wear or cracking. See Figure 6.
- The below grade piping into the wet well is PVC and the above grade piping is steel. The steel appears to be painted with bitumastic coating. The coating shows sign of incomplete coverage and rust appears to be developing on the steel pipe (see Figure 18).
- Since odor is not an issue at this time, the fan is unused. The carbon was replaced at 6-month intervals when in use (see Figure 18).

Vault

- The check valve vault did not have debris.
- There was standing water in the vault. Mr. Ducharme indicated that during the winter the vault had some water due to the rains, but during the summer, the vault was dry. There was no sump in the vault for rain water to drain. There was also no discharge from the vault to the wet well as shown in the as-built drawings. See Figure 4.
- Although the vault was unlined, the concrete was in good condition and did not show signs of deterioration. See Figure 4.
- Stainless steel chains attached to the check valve lever ran to the top of the vault. The chains were used to open the check valve. See Figure 4.
- The coating on the plug valve, check valve, and flexible couplings appeared to be good condition. There were no signs of rust The nuts and bolts were stainless steel. See Figure 4.
- The coating of the ductile iron piping in the vault appeared to be good condition. See Figure 4.
- There is no ladder in the vault.
- The aluminum hatch shows signs of wear. Although the aluminum is pitted, the hatch opens easily and the spring-operator appears to work well. See Figure 19.

Pump/Motor Control Cabinet

- Pump controls are housed in a stainless steel NEMA 3R cabinet. See Figure 20.
- The cabinet does not shown any signs of rust or leakage.
- The front of the cabinet has two panels.

  Left Panel (see Figure 21):

  - Siemens Intra-Link LC 150 controller – pump level calls controller, wet well level
  - CB1T Controller for high-level alarm.

- Sensaphone panel – The telephone line was initially used to relay messages to operators for pump station alarms. This system has been replaced by SCADA system with signal to the treatment plant control system.

Right Panel (see Figure 22):

- Main, emergency and transformer control switches
- Run time meter for each pump
- Pump and ventilation fan selector switch (Hand/Off/Auto)
- Pump and ventilation fan circuit breakers
- Pump indictor lights (pump run and pump temperature, seal failures)
- Pump and ventilation fan reset push buttons

- The indicator lights were not tested.
- The power to the pump station was shut so the pumps could be removed for cleaning. The lock-out tag procedures was followed. When the pump station loses power, the control panel at the wastewater treatment facility indicates the loss of the pump station signal and a text message is sent to Mr. Ducharme (see Figure 23).

Flow monitoring is performed at the Arvin Wastewater Treatment Plant. Snapshots of 24-hours of flow is depicted in Figures 24 and 25. Note that the pumps are duty/stand by operation with alternating starts. Each pump turns on no more than three times per hour. The pump run time is approximately 5 minutes.

Attachments:

A Pump Station Inspection Photographs
B Pump Station Inspection Checklist
C Pump Station Drawings (Shts 1-8)
D Pump Station Submittal

ATTACHMENT A
Pump Station Inspection Photographs

FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 3A

FIGURE 3B

FIGURE 3C

FIGURE 4

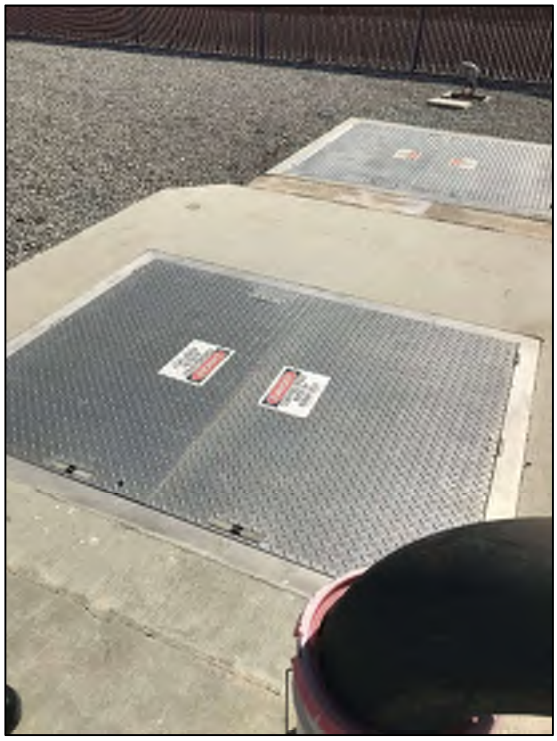


FIGURE 5

FIGURE 6

FIGURE 7

FIGURE 8

FIGURE 9

FIGURE 10

FIGURE 11

FIGURE 11A

FIGURE 12

FIGURE 12A

FIGURE 13

FIGURE 14

FIGURE 15

FIGURE 16

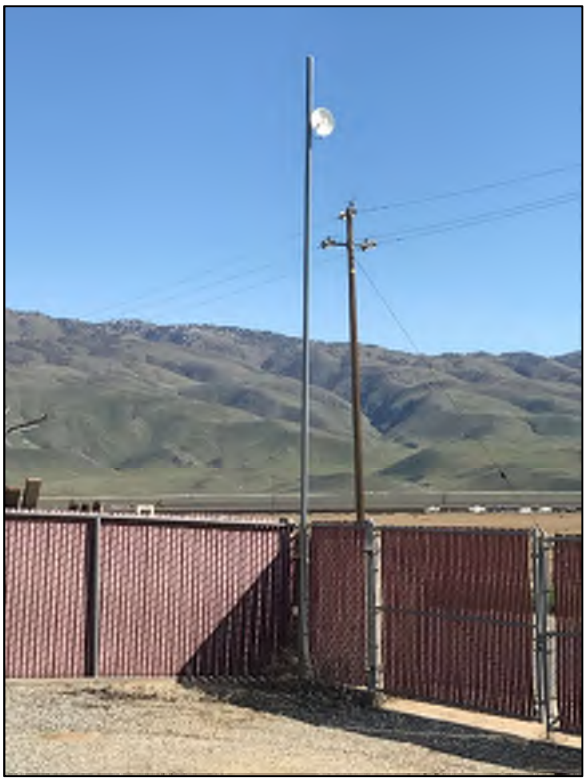


FIGURE 17

FIGURE 18

NOTICE
TO INSTALLERS
H-20 LOAD RATING
for
OFF-STREET LOCATIONS
without
HIGH DENSITY TRAFFIC

FIGURE 19

FIGURE 20

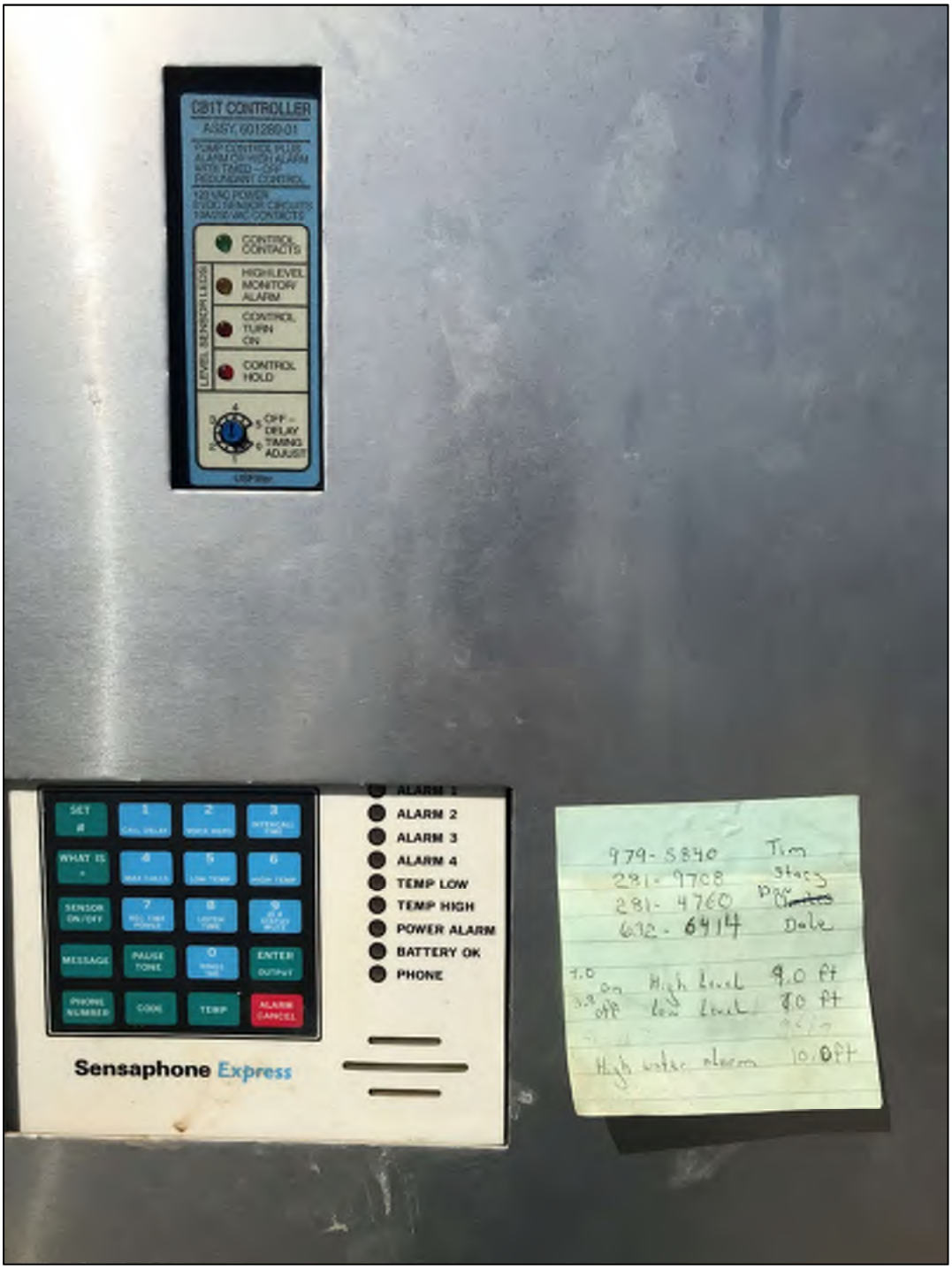

CONTROL CONTACTS
HIGH LEVEL MONITOR ALARM
CONTROL TURN ON
CONTROL HOLD
OFF - DELAY TIMING ADJUST
ALARM 1
ALARM 2
ALARM 3
ALARM 4
TEMP LOW
TEMP HIGH
POWER ALARM
BATTERY OK
PHONE
SET #
WHAT IS
SENSOR ON/OFF
MESSAGE
PAUSE TONE
ENTER OUTPUT
PHONE NUMBER
CODE
TEMP
ALARM CANCEL
Sensaphone Express
979-5840 Tim
281-9708 Stacy
281-4760 Doug
632-6414 Dale
High level 9.0 ft
low level 8.0 ft
High water alarm 10.0 ft

FIGURE 21

FIGURE 22

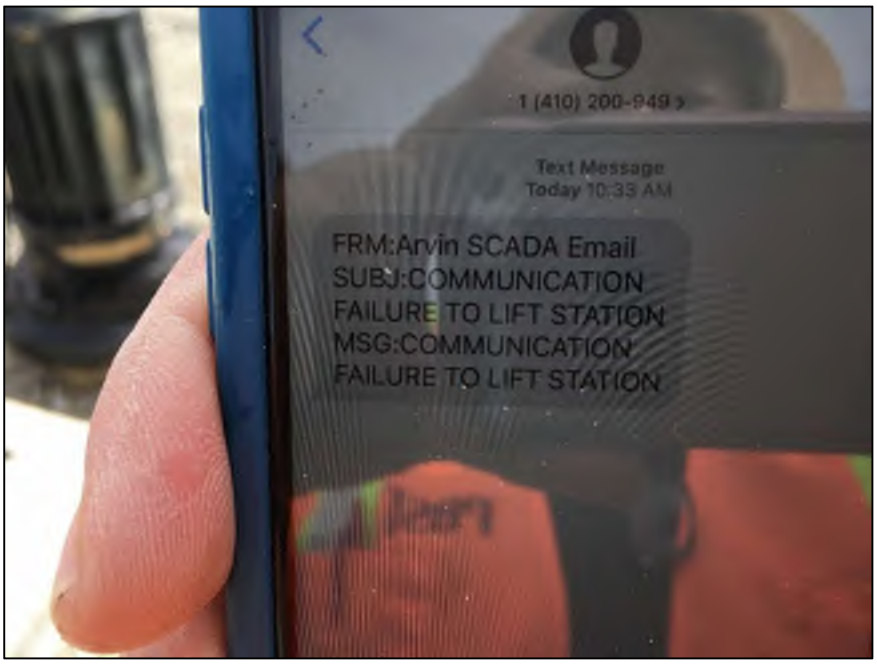


FIGURE 23

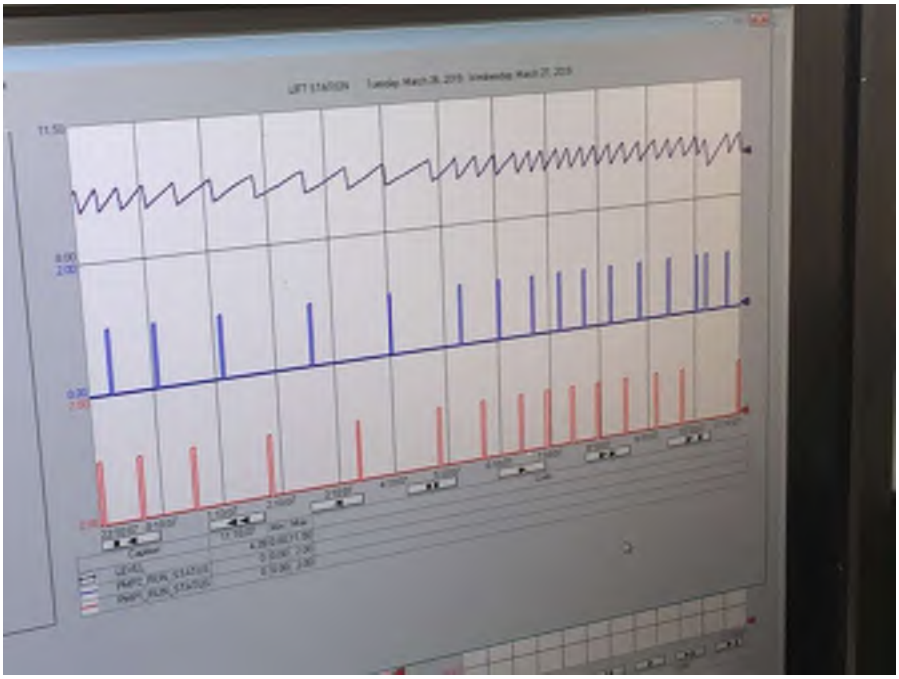


FIGURE 24

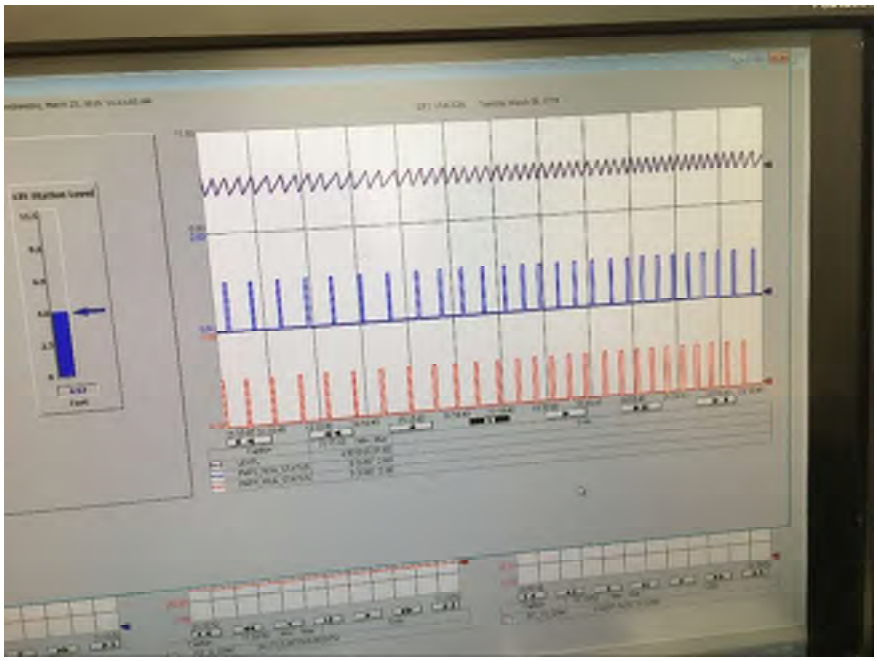


FIGURE 25

ATTACHMENT B
Pump Station Inspection Checklist

Harris & Associates

3/27/19

PUMP STATION INSPECTION CHECKLIST

SITE

- [NA] Inspect asphalt; check slope for proper drainage (no puddles) GRAVEL
- [✓] Inspect grounds CLEAN
- [✓] Inspect fencing and gate; ensure correct operation of gate (full swing) YES
- [✓] Inspect fence posts and fabric for correct material (vinyl coated black or brown) YES
- [✓] Ensure that all debris has been removed from site
- [✓] Ensure that all required signage has been installed (incl. Pump Station I.D. sign)

WETWELL

- [✓] Inspect interior coating (cracks, blisters, loose material, exposed concrete, etc.) INTERIOR COATED WITH COAL TAR EPOXY. SOME DETERIORATION
- [—] Inspect exterior coating (coal-tar epoxy) NOTED ON AB
- [✓] Inspect concrete penetrations (discharge piping, conduits, etc.) SAND GROUTED
- [—] Ensure that all penetrations are cored and link-sealed, then finished with epoxy grout NOTED ON AB WITH SAND GROUT
- [✓] Check proper operation of aluminum hatch and placement per approved design
- [✓] Check and verify opening of hatch to accommodate pump extraction
- [✓] Verify all required signage has been provided ("Confined Space Entry - Permit Required", OSHA, etc.)
- [✓] Verify operating range of (bubbler and/or floats) per approved design FLOATS VISIBLE. VEOLIA MENTIONED FLOATS OPERATED ONCE PER MONTH. MAIN LEVEL CONTROL IS SUBMERSIBLE LEVEL TRANSDUCER.
- [✓] Inspect alignment of discharge piping
- [✓] Ensure that stainless steel bolts are utilized in ductile iron piping
- [✓] Inspect paint used on piping
- [—] Ensure that FCA is installed at 90-degree elbow on discharge piping PUMP DISCHARGE FLANGE NOT VISIBLE BUT OPERATED SMOOTHLY.
- [NA] Inspect alignment of poly ladder rungs, ladder placement, and ladder mast bracket NO LADDER
- [NA] Inspect grating platform and supports (stainless and fiberglass grating) w/ stainless steel fasteners NONE

PUMPS

- [✓] Pull each pump and reset; check for ease of removal, alignment of rails and proper sealing at disconnect flange EACH PUMP WAS PULLED FOR CLEANING
- [✓] Inspect for any damage to paint on pump
- [✓] Inspect cord and cord placement CORDS NEWLY COILED

VALVE VAULT

- [✓] Inspect interior coating (cracks, blisters, loose material, exposed concrete, etc.) NO INTERIOR COATING.
- [✓] Inspect paint on all mechanical piping (cracks, blisters, loose paint) SOME CRACKS & CORPS.

- [x] Inspect alignment of discharge piping
- [ ] Verify pressure gauges are in place and the correct type DONE
- [x] Check and verify opening of hatch
- [x] Verify all required signage has been provided ("Confined Space Entry - Permit Required", OSHA, etc.)
- [x] Ensure drain line is at grade from valve vault to wetwell DONE. SOME STANDING PUDDLES OF WATER DUE TO RAIN. DRY IN SUMMER.

PIPING

- [ ] Ensure alignment of discharge piping between wetwell and valve vault NO ISSUE!

ELECTRICAL

- [ ] Verify that seal-offs are sealed with CHICO
- [x] Verify that pump motor leads are a continuous run from pump to control panel
- [ ] Verify the usage of stainless steel strain reliefs on all pump and float cords
- [NA] Verify that bubbler line is sealed off in conduit NO BUBBLER
- [ ] Verify seal-offs are located in vault, and that all conduit penetrations are grouted NOTED AS ATB

- [ ] Ensure that ground rods are accessible DID NOT CHECK

CONTROL PANEL

- [ ] Ensure that wiring schematic is in door pocket DID NOT SEE
- [x] Ensure that "control" side of panel is oriented facing the wetwell
- [x] Verify UL labeling
- [NA] Inspect enclosure for chipped paint or other damage STAINLESS STEEL CABINETS
- [NA] Utilize mil-thickness gauge to verify proper DFT
- [NA] Verify signed-off electrical inspection report from governing electrical inspector
- [ ] Verify all pilot lights are operational DID NOT CHECK
- [x] Verify all wires are labeled
- [x] Verify all placards are in place
- [x] Verify all wiring debris has been removed from enclosure
- [x] General inspection of field wiring
- [ ] Conduct operation test of controls NOT PERFORMED
- [NA] Pump manufacturer to supply additional motor nameplates (crew to place on interior door)
- [NA] Specialty products mounted and placed in interior of control panel

- [NA] Panel manufacturer to conduct O&M training

TELEMETRY SYSTEM

- [x] Visually verify all components have been provided and pre-wired (radio, antenna, all associated wiring, alarm points, etc.) ONLY ONE SCADA SIGNAL - PUMP FAIL / HIGH. US OFF LINE NOTIFIED AT WWTP FOR WHEN POWER IS LOST.
- [x] Check communication link to WWTP base station DISCONNECTED SIGNAL @ WWTP.
- [x] Inspect field wiring
- [x] Ensure that standard mast and antenna are supplied (standard anchoring method)

OPERATIONS TEST - PUMP SYSTEM

- [NA] Ensure contractor and contractor's representatives are present during start-up (electrician, control panel manufacturer, pump manufacturer, mechanical, etc. - generator manufacturer optional)
- [x] Verify pump rotation, reverse leads if necessary
- [NA] Throttle valves while filling force main, if applicable
- [NA] Draw-Down Test - Calculate actual GPM and compare to design specifications (check both pumps)
- [NA] Add water to system and/or simulate flow; confirm operation of liquid level control system
- [NA] Inspect sealing flange of pump for proper seal (no leaks)
- [x] Pull pumps and extract from wetwell; ensure clearances are maintained and pumps travel smoothly on rail system; check pump cords for obvious obstructions
- [x] Test "high-water" and "low-water" alarms pumps TURNED ON/OFF
- [x] Note any unusual noises/vibration NONE

OPERATIONS TEST - GENERATOR NO GENERATOR ON-SITE.

- [NA] Verify diesel tank is fully fueled after manufacturer's representative has performed load run
- [NA] Run generator in "manual" mode; check hertz, voltage, etc; verify operation of load bank
- [NA] Verify certified affidavit of start-up and load testing from manufacturer's representative
- [NA] Receipt of manufacturer's warranty (2-year)
- [NA] Test "auto shut-down" on overspeed circuit
- [NA] Test to see of genset meets decibel requirements
- [NA] Simulate power failure (disconnect main breaker); verify automatic start of genset
- [NA] Verify automatic transfer of power to emergency source; check for proper time delay between sequences HAVE MANUAL TRANSFER SWITCH.
- [NA] Let run for ten (10) minutes
- [NA] Restore utility power source; verify automatic transfer, cool-down cycle time, and shut down
- [NA] Test load bank for proper operation
- [NA] Ensure that separate circuits are provided for battery charger and block heater

- [x] NA Test block heater and battery charge for proper operation

OPERATIONS & MAINTENANCE MANUALS

- [x] Receipt of O&M manuals
- [ ] Check for detailed equipment literature
  - [x] Submersible pumps
  - [ ] Plug valves
  - [ ] Swing check valves
  - [ ] Gauges
  - [ ] Ball valves
  - [ ] Control panel
  - [ ] Transfer switch
  - [ ] Softstart
  - [ ] Air compressor
  - [ ] Wiring schematic
  - [ ] Specification sheet
  - [ ] Outline drawing
  - [ ] Operator's manual
  - [ ] Parts catalog
  - [ ] Installation manual
  - [ ] Engine operation and maintenance manual
  - [ ] Engine parts catalog
  - [ ] Certified test record
  - [ ] Approved construction drawings (plan, profile and details)
  - [ ] Map of tributary area

O&M MANUAL WAS CATALOG CUT FROM PS MANUFACTURER. NO O&M ACTUALLY INCLUDED.

ATTACHMENT C
Pump Station Drawings (Shts 1-7)

SEWER & PUMP STATION PLANS
TRACT 6175 & SURROUNDING PARCELS
ARVIN, CALIFORNIA

APPROVED BY:

4-8-05

GERALD F. HELT — DATE
CITY ENGINEER

BENCHMARK USED:

BRASS DISK SET IN CONCRETE STAMPED "H 826 1947" AT THE SOUTHEAST CORNER OF THE INTERSECTION OF SYCAMORE ROAD AND TEJON HIGHWAY.
ELEVATION = 418.81 NGVD

BENCHMARK SET:

TOP OF MONUMENT AT THE NORTHWEST CORNER OF SECTION 35 31/29
ELEVATION = 410.23 NGVD

MATERIALS LIST

ESTIMATED QUANTITIES, NOT TO BE USED FOR BIDDING PURPOSES *

SEWER SYSTEM

STANDARD MANHOLES	10 EA
PRESSURE CLEAN-OUTS	9 EA
8" SEWER MAIN	940 LF
6" FORCE MAIN	2630 LF
TIE INS	1 EA.
PUMPING STATION	1 EA.

(SEPERATE MATERIALS LIST FOR PUMP STATION ON SHEET 8)

* CONTRACTOR SHALL PREPARE HIS OWN ESTIMATE OF QUANTITIES AND MATERIALS FOR BIDDING

LEGEND

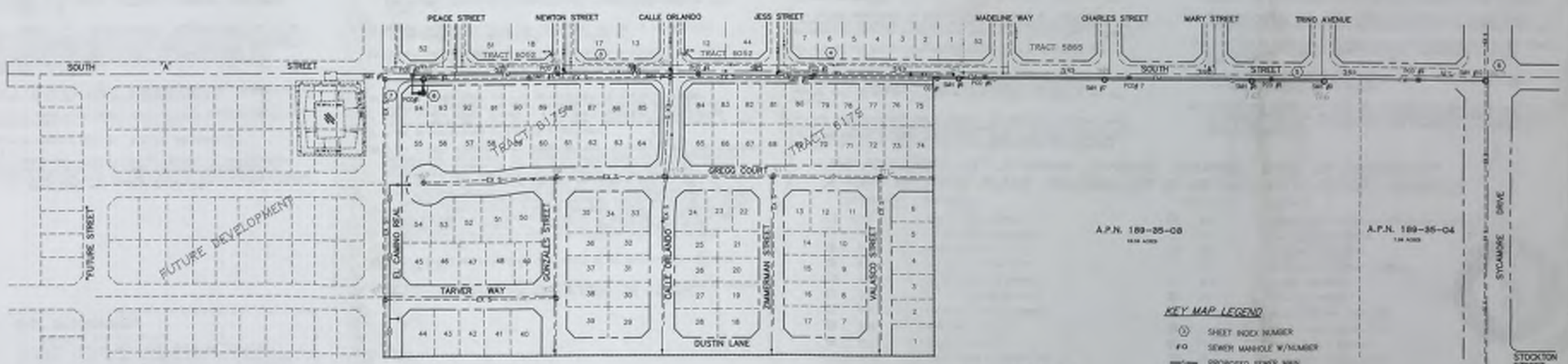
- PROPOSED SEWER MANHOLE w/NUMBER
- PROPOSED SEWER CLEANOUT w/NUMBER
- 8" S — PROPOSED SEWER LINE w/SIZE
- PROPOSED RIGHT-OF-WAY
- 6" FM — PROPOSED FORCE MAIN w/SIZE
- PROPOSED FORCE MAIN CLEAN-OUT
- EX W — EXISTING WATERLINE (SHOWN FOR INFORMATION ONLY)
- EXISTING SEWER MANHOLE
- EXISTING SEWER CLEANOUT
- EX S — EXISTING SEWER MAIN

R/W	STREET RIGHT-OF-WAY
"O"	EXISTING FIRE HYDRANT
O	EXISTING BLOW-OFF
T.C.O.	TOP OF CLEANOUT ELEVATION
INV.	PIPE INVERT ELEVATION
(E,S,N,W)	(EAST, SOUTH, NORTH, WEST)
P.V.C.	POLYVINYL CHLORIDE
±	= APPROXIMATE LENGTHS. CONTRACTOR SHALL VERIFY ALL LENGTHS PRIOR TO BIDDING THIS PROJECT
R.C.P.	REINFORCED CONCRETE PIPE
EX.	EXISTING
FL	FLOWLINE
PCO	PRESSURE CLEAN-OUT
SMH	SEWER MANHOLE

SHEET NO. INDEX

1. TITLE SHEET
2. GENERAL NOTES
3. SOUTH 'A' STREET– SEWER PLAN AND PROFILE
4. SOUTH 'A' STREET– SEWER PLAN AND PROFILE
5. SOUTH 'A' STREET– SEWER PLAN AND PROFILE
6. SOUTH 'A' STREET – TIE-IN PLAN AND PROFILE
7. SEWER PUMPING STATION – SITE PLAN
8. SEWER PUMPING STATION – WET WELL AND PUMP DETAIL
9. SEWER PUMPING STATION – DETAIL SHEET
10. SEWER PUMPING STATION – ELECTRICAL DETAILS
11. SEWER PUMPING STATION – TECHNICAL SPECIFICATIONS

REGISTERED PROFESSIONAL ENGINEER — MATTHEW K. VIVELLA — RCE 43130 — Exp. 3-31-06 — STATE OF CALIFORNIA



KEY MAP
SCALE: 1"=150'

KEY MAP LEGEND

- SHEET INDEX NUMBER
- SEWER MANHOLE W/NUMBER
- PROPOSED SEWER MAIN
- PROPOSED STORM DRAIN
- PROPOSED SEWER FORCE MAIN
- PROPOSED SEWER FORCE MAIN CLEAN-OUT
- EXISTING WATERLINE
- EXISTING SEWER MANHOLE
- EXISTING SEWER CLEANOUT
- EXISTING SEWER MAIN

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PINNACLE Engineering
1712 19th Street, Suite 101, Bakersfield, CA 93301
Phone: (661) 869-0184 Fax: (661) 328-0607

REVISIONS	DATE

SEWER AND PUMP STATION PLANS
TITLE SHEET
ARVIN, CALIFORNIA

JOB No.:	04-1474
DWG NO.:	041474SHT1
DATE:	03/28/05
DRAWN BY:	JV
CHECKED BY:	MKV
SHEET	1 OF 11 SHEETS

CITY OF ARVIN
SEWER SPECIFICATIONS

SEWER NOTES

1. GENERAL CONTRACTOR WILL FURNISH ALL MATERIALS, TOOLS, LABOR, EQUIPMENT AND SUPERVISION NECESSARY TO COMPLETE INSTALLATION.

2. VCP INSTALLATION:

   A. MATERIALS: THE PIPE AND FITTINGS SHALL BE EXTRA STRENGTH VITRIFIED CLAY CONFORMING TO CURRENT ASTM DESIGNATION C-700, AND SHALL BE INSTALLED IN CONFORMANCE WITH THE CURRENT ASTM DESIGNATION C-12.

   B. JOINTS:

      1. THE PIPE AND FITTINGS SHALL HAVE A SOCKET END AND A SPIGOT END WITH COMPRESSION JOINTS CONFORMING WITH THE CURRENT ASTM DESIGNATION C-425.

      2. THE PIPE FITTINGS FOR 6", 8", 10", AND 12" SANITARY SEWER MAINS MAY BE PLAIN-END WITH COMPRESSION COUPLINGS CONFORMING WITH THE CURRENT ASTM DESIGNATION C-425. EXCEPTING THAT A STAINLESS STEEL SHEAR RING AS MANUFACTURED BY MISSION CLAY PRODUCTS CORPORATION FOR THEIR "MAINLINE" BAND-SEAL COMPRESSION COUPLING, OR APPROVED EQUAL, SHALL BE REQUIRED.

      3. THE PIPE AND FITTINGS FOR PRIVATE SANITARY SEWER HOUSE OR BUILDING LATERALS MAY BE PLAIN-END WITH COMPRESSION COUPLINGS CONFORMING WITH THE CURRENT ASTM DESIGNATION C-425. (STAINLESS STEEL SHEAR RINGS ARE NOT REQUIRED).

3. ABS PIPE INSTALLATION:

   A. MATERIALS: PIPE AND FITTINGS SHALL MEET THE REQUIREMENTS OF ASTM SPECIFICATIONS D 2680 AND D 2751. PIPE AND FITTINGS SHALL BE HOMOGENEOUS THROUGHOUT AND FREE FROM CRACKS, HOLES, FOREIGN INCLUSIONS OR OTHER INJURIOUS DEFECTS. FITTINGS SHALL BE INJECTION MOLDED AND SHALL BE INSTALLED IN LINE ON NEW PIPELINES; CUT-IN FITTINGS ARE NOT PERMITTED.

   B. JOINTS: USE ONLY SOLVENT WELDED JOINTS. THE ASSEMBLY OF JOINTS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. WHERE ABS PIPE CONNECTS TO VCP, USE COUPLINGS APPROVED BY THE CITY OF ARVIN.

   C. INSTALLATION: PIPE AND FITTINGS SHOULD BE INSTALLED IN ACCORDANCE WITH ASTM D 2321. ONLY CLASS 1, II OR III EMBEDMENT MATERIALS WILL BE CONSIDERED SUITABLE.

4. PVC PIPE INSTALLATION:

   A. MATERIALS: PIPE AND FITTINGS SHALL MEET THE REQUIREMENTS OF ASTM SPECIFICATIONS D 3034 AND SDR 35. PIPE AND FITTINGS SHALL BE HOMOGENEOUS THROUGHOUT AND FREE FROM CRACKS, HOLES, FOREIGN INCLUSIONS OR OTHER INJURIOUS DEFECTS. FITTINGS SHALL BE INJECTION MOLDED AND SHALL BE INSTALLED IN LINE ON NEW PIPELINES; CUT-IN FITTINGS ARE NOT PERMITTED.

   B. JOINTS: USE ONLY ELASTOMERIC GASKET JOINTS. THE ASSEMBLY OF JOINTS SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. WHERE PVC PIPE CONNECTS TO VCP, USE COUPLINGS APPROVED BY THE CITY OF ARVIN.

   C. INSTALLATION: PIPE AND FITTINGS SHOULD BE INSTALLED IN ACCORDANCE WITH ASTM D 2321. ONLY CLASS I, II OR III EMBEDMENT MATERIALS WILL BE CONSIDERED SUITABLE.

5. SYSTEM TESTING:

   INSTALLED PIPE SHALL BE TESTED IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS OF THE ARVIN IMPROVEMENT STANDARDS MANUAL AND WITH THE RECOMMENDATIONS OF THE MANUFACTURER AND ACCEPTABLE TO THE CITY OF ARVIN. 24 HOURS NOTICE WILL BE REQUIRED FOR TEST AND INSPECTION.

6. WYE-FITTINGS SHALL BE INJECTION MOLDED IN-LINE AND SHALL BE USED FOR ALL LATERAL CONNECTIONS AND SHALL BE ROTATED A MINIMUM OF 23° AND A MAXIMUM OF 45° ABOVE THE HORIZONTAL PLANE RUNNING THROUGH THE CENTERLINE OF THE MAIN. WYE FITTINGS ONLY SHALL BE USED FOR VCP. ALL SEWER STUBS SHALL BE CLOSED WITH A STANDARD PLASTIC PLUG (SOLVENT WELDED).

7. THE MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ARVIN DRAWING S-7, S-6 AND S-5 AND SECTION 70-1.02H AND 71-1.07 OF THE STANDARD SPECIFICATIONS OF THE STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION, LATEST EDITION. THE CLEANOUTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ARVIN STANDARD DRAWINGS S-3 AND S-4.

8. ALL SEWER LATERALS TO BE 4" IN DIAMETER EXCEPT AS OTHERWISE NOTED ON PLANS AND EXTEND 4 FEET BEYOND PROPERTY LINE.

9. SURFACE MARKERS FOR SEWER LATERALS SHALL BE INSTALLED PER CITY OF ARVIN DRAWING S-1.

10. 24 HOUR NOTICE IS REQUIRED FOR TESTING AND INSPECTION.

11. FOR CURVED PIPE: IDENTIFICATION TAPE DESIGNED FOR USE ON SEWERS SHALL BE PLACED ON TOP OF SEWER MAIN ALONG ITS ENTIRE LENGTH. IDENTIFICATION TAPE SHALL ALSO BE PLACED ON SEWER LATERALS EXTENDING 1 FOOT ABOVE SEWER MAIN TO RIGHT-OF-WAY LINE.

NOTE TO CONTRACTOR

ALL MANHOLES AND CLEANOUTS INCLUDING EXISTING MANHOLES, SHALL BE ADJUSTED TO FINISH GRADE IN ACCORDANCE WITH CITY STANDARDS. EXISTING MANHOLES MAY REQUIRE REMOVAL OF EXISTING CONE, AND REMOVAL OR "CHANGE OUT" OF BARREL RINGS.

GENERAL NOTES:

1. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS BEFORE START OF CONSTRUCTION. A PERMIT SHALL BE OBTAINED FROM CITY PUBLIC WORKS DEPARTMENT FOR WORK TO BE DONE IN THE CITY STREET RIGHT-OF-WAY.
2. ANY TRENCHING TO BE CONDUCTED WITHIN THIS PROJECT SHALL BE BACKFILLED AND COMPACTED PER CITY STANDARD DETAIL W-1.
3. THE CONTRACTOR SHALL REMOVE OR RELOCATE ALL OBSTRUCTIONS AS DIRECTED BY THE CITY ENGINEER.
4. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.
5. IF A PROBLEM SHOULD ARISE DURING THE COURSE OF CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ENGINEER IMMEDIATELY PRIOR TO ANY FURTHER WORK.
6. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CITY OF ARVIN STANDARDS AND STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, LATEST ADDITION.
7. PRIOR TO THE START OF ANY PHASE OF CONSTRUCTION, THE CITY CONSTRUCTION INSPECTION DEPARTMENT SHALL BE GIVEN 24 HOURS NOTICE (661)854-3134.
8. ALL EXISTING IMPROVEMENTS (CURB, GUTTER, SIDEWALK, CROSS-GUTTER, FENCING, ETC.) THAT ARE REMOVED, DAMAGED, OR UNDERCUT SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE CITY ENGINEER.
9. THE LOCATIONS OF EXISTING UTILITIES AND UNDERGROUND PIPELINES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND DEPTH OF ALL EXISTING UTILITIES AND UNDERGROUND PIPELINES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE, PRESERVE AND PROTECT ANY AND ALL UNDERGROUND UTILITIES AND PIPELINES. THE CONTRACTOR SHALL CALL U.S.A. (UNDERGROUND SERVICE ALERT) 1-800-642-2444 TWO WORKING DAYS PRIOR TO ANY CONSTRUCTION OR EXCAVATION.
10. IF THE CONTRACTOR IS IN DOUBT AS TO THE MEANING OF ANY PART OF THE PLAN AND SPECIFICATIONS OR FINDS DISCREPANCIES IN OR OMISSIONS FROM THE DRAWINGS, HE SHALL SUBMIT A WRITTEN REQUEST FOR AN INTERPRETATION OR A CORRECTION THEREOF, PRIOR TO FILING HIS BID PRICE FOR THE PROJECT.
11. IN THE EVENT CONSTRUCTION STAKING BASED ON CONSULTANT'S PLANS, DRAWINGS OR OTHER DOCUMENTS IS ACCOMPLISHED BY OTHER THAN THE CONSULTANT, CLIENT AGREES TO HOLD CONSULTANT HARMLESS AND RELEASE CONSULTANT FROM ALL LIABILITY ARISING FROM THE USE OF SAID PLANS, DRAWINGS OR OTHER DOCUMENTS.
12. ALL EXISTING PAVING AND SURFACING REMOVED, DAMAGED OR UNDERCUT SHALL BE REPLACED IN ACCORDANCE WITH CITY OF ARVIN DRAWING R-2.
13. COMPACTION TESTS SHALL BE THE RESPONSIBILITY OF THE DEVELOPER. THE NUMBER AND LOCATION OF REQUIRED TESTS SHALL BE DETERMINED BY THE CITY ENGINEER. THE COST OF RETESTING DUE TO FAILED COMPACTION TESTS WILL BE BACKCHARGED TO THE CONTRACTOR.
14. PINNACLE ENGINEERING SHALL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO, OR USES OF, THESE PLANS. ALL CHANGES TO THESE PLANS MUST BE APPROVED IN WRITING BY PINNACLE ENGINEERING.
15. SEE WATER AND STREET IMPROVEMENT PLANS FOR OTHER IMPROVEMENTS THAT ARE PART OF THIS PROJECT.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING ALL TRENCHES. IF TRENCHES OR PIPING BECOME DAMAGED DUE TO WATER INFILTRATION, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR THE TRENCH AND PIPING TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTORS EXPENSE.
17. FLOODING OR WATERJETTING SHALL NOT BE USED FOR BACKFILL COMPACTION.
18. DRAWINGS SHOWN ON THIS SHEET ARE FOR REFERENCE ONLY. CONTRACTOR SHALL OBTAIN A COPY OF "CITY OF ARVIN SUBDIVISION STANDARDS" AND DRAWINGS FOR HIS USE. THESE STANDARD DRAWINGS SHALL BE CONSIDERED A PART OF THESE PLANS.
19. NORMAL CONSTRUCTION STAKING WILL BE SUPPLIED ONE TIME TO THE DEVELOPER. ALL RESTAKING WILL BE BACKCHARGED TO THE CONTRACTOR.
20. CONTRACTOR SHALL VERIFY LOCATIONS AND ELEVATIONS OF EXISTING SEWER LINES THAT THE NEW SYSTEM TIES INTO. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER SO THAT ANY NECESSARY ADJUSTMENTS CAN BE MADE TO THE PLANS.
21. AN OPEN STREET PERMIT SHALL BE OBTAINED FROM THE CITY OF ARVIN PUBLIC WORKS DEPARTMENT FOR ANY WORK PERFORMED WITHIN EXISTING ACCEPTED STREET RIGHT-OF-WAY. UNLESS SECURED BY A SUBDIVISION AGREEMENT, A DEPOSIT BASED ON AN APPROVED ENGINEER'S ESTIMATE FOR WORK PERFORMED WITHIN THE RIGHT-OF-WAY SHALL BE POSTED PRIOR TO ISSUANCE OF THE PERMIT.
22. PRIOR TO FINAL ACCEPTANCE, ALL SEWER LINES SHALL BE INSPECTED WITH VIDEO EQUIPMENT DESIGNED FOR THIS PURPOSE. THE TELEVISION CAMERA SHALL HAVE THE CAPABILITY OF ROTATING 360°, IN ORDER TO VIEW AND RECORD THE TOP AND SIDES OF THE PIPE, AS REQUIRED. THE VIDEO INSPECTION SHALL BE WITNESSED BY THE CITY'S CONSTRUCTION INSPECTOR, WHO WILL ALSO INITIAL AND DATE THE "CHAIN OF CUSTODY" FORM. THE SUBDIVIDER SHALL IMMEDIATELY NOTIFY CITY OF ANY PIPE LOCATIONS REVEALED TO BE NOT IN COMPLIANCE WITH THE SPECIFICATIONS. A RECORDED VIDEO CASSETTE, THE COMPLETED "CHAIN OF CUSTODY" FORM AND A WRITTEN LOG (WHICH INCLUDES THE STATIONING, BASED ON THE STATIONING OF THE APPROVED PLANS, OF ALL CONNECTED LATERALS) OF THE INSPECTION SHALL BE PROVIDED FOR VIEWING, AND SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO ACCEPTANCE. AFTER ACCEPTANCE, THE VIDEO CASSETTE SHALL BECOME THE PROPERTY OF THE CITY.
23. CLASS I BEDDING AND EMBANKMENT IS REQUIRED FOR ALL PLASTIC SEWER PIPE WITHIN THE PIPE ZONE.
24. CONTRACTOR TO VERIFY POSITIVE SLOPE FROM MANHOLE PRIOR TO CONNECTING TO EXISTING STUB. IF THE POSITIVE SLOPE DOES NOT EXIST, REPLACE STUB TO MANHOLE.

GRADING NOTES

1. ALL GRADING AND SITE PREPARATION SHALL CONFORM TO THIS PLAN AND SHALL CONFORM WITH APPENDIX CHAPTER 33 OF UNIFORM BUILDING CODE AND STANDARDS PERTAINING THERETO AND THE GEOTECHNICAL INVESTIGATION PREPARED BY SOILS ENGINEERING, INC. DATED NOVEMBER 2, 1998 AND SHALL BE MADE A PART HEREOF.
2. ALL DESIGN ELEVATIONS SHOWN ARE TO FINISH GRADE.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING THE PAD AND PAVING AREAS TO WITHIN 0.1 FOOT OF SUBGRADE. IF SUCH AREAS SHOULD BE FOUND TO BE MORE THAN 0.1 FOOT FROM THE DESIGN SUBGRADE ELEVATION AFTER COMPLETION OF GRADING, THE CONTRACTOR SHALL RETURN AND CORRECT THE GRADING AT NO COST TO THE OWNER.
4. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS BEFORE START OF CONSTRUCTION. A PERMIT SHALL BE OBTAINED FROM THE CITY OF ARVIN FOR ANY WORK TO BE PERFORMED IN THE CITY RIGHT-OF-WAY.
5. UPON COMPLETION OF GRADING AND BEFORE THE START OF CONSTRUCTION, A FINAL SOILS REPORT COVERING THE SITE PREPARATION AND GRADING SHALL BE SUBMITTED TO THE ENGINEER AND BUILDING DEPARTMENT BY THE SOILS ENGINEER.
6. IF A PROBLEM OR CONFLICT SHOULD ARISE DURING THE COURSE OF THIS PROJECT, IT IS THE RESPONSIBILITY OF THE OWNER OR THE GRADING CONTRACTOR TO NOTIFY THE ENGINEER IMMEDIATELY PRIOR TO ANY FURTHER WORK.
7. ALL GRADING WORK SHALL BE SUPERVISED AS "ENGINEERED GRADING" IN ACCORDANCE WITH APPENDIX CHAPTER 33 OF UNIFORM BUILDING CODE. THE DESIGN ENGINEER SHALL EXERCISE SUFFICIENT SUPERVISORY CONTROL DURING GRADING AND CONSTRUCTION TO INSURE COMPLIANCE WITH THE PLANS, SPECIFICATIONS AND CODE WITHIN HIS PURVIEW.
8. DUST CONTROL:

   IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PREVENT A DUST NUISANCE FROM ORIGINATING FROM THE SITE OF WORK AS A RESULT OF HIS OPERATIONS DURING THE EFFECTIVE PERIOD OF THIS CONTRACT. PREVENTATIVE MEASURES TO BE TAKEN BY THE CONTRACTOR SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:

   A. WATER SHALL BE APPLIED TO ALL UNPAVED AREAS AS REQUIRED TO PREVENT THE SURFACES FROM BECOMING DRY ENOUGH TO PERMIT DUST FORMATION.

   B. PAVED SURFACES OVER WHICH VEHICULAR TRAFFIC IS PERMITTED TO TRAVEL SHALL BE KEPT FREE OF DIRT.

9. THE SOIL ENGINEER SHALL PROVIDE SUFFICIENT INSPECTIONS DURING THE PREPARATION OF THE NATURAL GROUND AND THE PLACEMENT AND COMPACTION OF THE FILL TO BE SATISFIED THAT THE WORK IS BEING PERFORMED IN ACCORDANCE WITH THE PLAN AND APPLICABLE CODE REQUIREMENTS.
10. EXISTING UNDERGROUND LINES HAVE BEEN SHOWN ON THIS PLAN ACCORDING TO AVAILABLE RECORDS. THE ENGINEER IS NOT RESPONSIBLE FOR POSSIBLE ERRORS OR OMISSIONS AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.
11. DURING GRADING, REASONABLE SEARCHING SHOULD BE PERFORMED FOR CONCEALED SUBSURFACE OBSTRUCTIONS. ALL ABANDONED SUBSURFACE OBSTRUCTIONS SHOULD BE REMOVED. IF THE TERMINUS OF ANY ABANDONED PIPING IS OUTSIDE THE PROJECT LIMITS, THE PIPING SHOULD BE REMOVED WITHIN THE PROJECT AND PROPERLY CAPPED AT THE PROJECT BOUNDARY.
12. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT; INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.
13. THE STAKING AND MARKING OF THE PROJECT SHALL BE DONE ONLY ONCE BY THE OWNER AND ALL RESTAKING OR REMARKING SHALL BE AT THE EXPENSE OF THE CONTRACTOR.
14. ALL ONSITE OR OFFSITE OBSTRUCTIONS SHALL BE REMOVED BY CONTRACTOR AT CONTRACTOR'S EXPENSE.
15. ANY EXISTING IMPROVEMENT OR UTILITY REMOVED, DAMAGED OR UNDERCUT BY CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE ENGINEER AND APPROVED BY THE CITY OF ARVIN AT THE CONTRACTOR'S EXPENSE.
16. ALL CUT AND FILL SLOPES SHALL NOT BE STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL.
17. SITE PREPARATION AND GRADING SHALL BE DONE UNDER THE SUPERVISION OF THE SOILS ENGINEER. THE SOILS ENGINEER, DESIGN ENGINEER, AND BUILDING OFFICIAL SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO PLACING OF ANY FILL MATERIAL.
18. THE SITE SHALL BE CLEARED AND GRUBBED OF ALL VEGETATION, INCLUDING ROOTS, LOOSE FILL, TRASH AND OTHER DELETERIOUS MATERIALS. ANY HOLE OR VOIDS LEFT AFTER THE REMOVAL OF TREES, ROOTS, SEPTIC TANKS, ABANDONED FOUNDATIONS, PIPELINES OR THE LIKE, SHALL BE FILLED AS REQUIRED BY THE SOILS ENGINEER.
19. FILL MATERIAL SHALL BE SUBJECT TO THE SOILS ENGINEER'S APPROVAL.
20. ALL FILL SLOPES SHALL NOT TOE OUT WITHIN 12 FEET HORIZONTALLY OF THE TOP OF EXISTING OR PLANNED CUT SLOPES.
21. THE CUT AND FILL QUANTITIES ARE CALCULATED USING A COMPACTING FACTOR OF 1.30. THE ENGINEER MAKES NO WARRANTEE EITHER DIRECT OR IMPLIED THAT THIS WILL BE THE ACTUAL COMPACTION FACTOR. IF A DEFICIENCY OR AN EXCESS OF SOIL ARISES, THE GRADING CONTRACTOR SHALL IMMEDIATELY CONTACT THE ENGINEER, WHO SHALL DETERMINE IF ADJUSTMENTS CAN BE MADE TO IMPROVE THE BALANCE BETWEEN CUT AND FILL.
22. THE CUT AND FILL QUANTITIES SHOWN ON THIS PLAN ARE FOR PERMIT PURPOSES ONLY. THE CONTRACTOR SHALL, AFTER EXAMINING THE PLAN, SOILS REPORT AND THE SITE TERRAIN, PREPARE HIS BID PRICE FOR THE PROJECT, BASED ON HIS OWN EARTHWORK CALCULATIONS.
23. EXPORT MATERIAL SHALL BE DISPOSED OF AT AN APPROVED SITE COORDINATED WITH THE INSPECTOR AT THE TIME OF GRADING.
24. IF THE CONTRACTOR IS IN DOUBT AS TO THE MEANING OF ANY PART OF THE PLAN AND SPECIFICATIONS OR FINDS DISCREPANCIES IN OR OMISSIONS FROM THE DRAWINGS, HE SHALL SUBMIT A WRITTEN REQUEST FOR AN INTERPRETATION OR A CORRECTION THEREOF, PRIOR TO FILING HIS BID PRICE FOR THE PROJECT.
25. THE CONTRACTOR SHALL COORDINATE WITH THE INSPECTOR AND THE ENGINEER THE LOCATION OF THE BORROW AREAS PRIOR TO BEGINNING CONSTRUCTION.
26. IN THE EVENT CONSTRUCTION STAKING BASED ON CONSULTANT'S PLANS, DRAWINGS OR OTHER DOCUMENTS IS ACCOMPLISHED BY OTHER THAN THE CONSULTANT, CLIENT AGREES TO HOLD CONSULTANT HARMLESS AND RELEASE CONSULTANT FROM ALL LIABILITY ARISING FROM THE USE OF SAID PLANS, DRAWINGS OR OTHER DOCUMENTS.
27. ANY TRENCHING TO BE DONE WITHIN THE PROJECT SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH THE CITY STANDARD DETAIL W-1.
28. SURFACE DRAINAGE SHALL BE 1% MINIMUM, EXCEPT AS WAIVED BY THE BUILDING OFFICIAL.
29. IT IS THE RESPONSIBILITY OF THE DEVELOPER AND HIS GRADING CONTRACTOR TO (A) FAMILIARIZE THEMSELVES WITH THE FOREGOING RECOMMENDATIONS, (B) NOTIFY THE ENGINEER WHEN SITE PREPARATION BEGINS AND BEFORE THE PLACEMENT OF FILLS, AND (C) INFORM THE ENGINEER IF ITEMS WHICH MIGHT EFFECT FOUNDATION STABILITY ARE ENCOUNTERED DURING EARTHWORK OPERATIONS SO THAT THEY MAY BE TREATED UNDER HIS DIRECTION (THESE MIGHT INCLUDE BURIED TRASH OR VEGETATION, PIPELINES, ABANDONED WELLS, OLD FILLS, ETC.)
30. ANY ABANDONED WELLS ON THE PROPERTY DISCOVERED DURING GRADING SHALL BE ADEQUATELY CAPPED IN ACCORDANCE WITH ALL APPLICABLE CITY, COUNTY AND STATE ORDINANCES.
31. A BERM OR DRAINAGE SWALE SHALL BE CONSTRUCTED ALONG THE TOP OF ALL CUT AND FILL SLOPES TO PREVENT RUNOFF FROM GOING OVER THE SLOPE. THE FACE OF ALL CUT AND FILL SLOPES SHALL BE PLANTED WITH A GROUND COVER INDIGENOUS TO THE AREA.
32. UNLESS OTHERWISE SPECIFIED IN THE SOILS REPORT, GROUND SURFACES TO RECEIVE CONCRETE DRIVEWAYS AND BITUMINOUS PAVEMENTS SHOULD BE SCARIFIED AND COMPACTED TO A MINIMUM DEPTH OF TWELVE INCHES (12") BELOW THE EXISTING GROUND SURFACE IN AREAS TO BE FILLED.

    COMPACTING IN PROPOSED PAVEMENT AREAS SHOULD BE TO A MINIMUM OF NINETY-FIVE PERCENT (95%) OF THE MAXIMUM DENSITY AS OBTAINED BY ASTM TEST METHOD D1557-78, METHOD A, AND SHOULD EXTEND TO A MINIMUM DISTANCE OF TWO FEET (2') BEYOND THE OUTSIDE EDGES OF PAVEMENTS.
33. ALL AREAS ON THE SITE ON WHICH STRUCTURES ARE TO BE PLACED MUST BE COMPACTED TO NINETY PERCENT (90%) DENSITY FOR A MINIMUM DISTANCE OF FIVE FEET (5') BEYOND THE OUTSIDE EDGES OF THE FOUNDATIONS OF THE STRUCTURES.

    THE DEPTH OF OVEREXCAVATION AND COMPACTION SHALL BE ONE FOOT BELOW EXISTING GROUND ELEVATION. THE BOTTOM SURFACE SHALL BE SCARIFIED TO A DEPTH OF SIX INCHES (6") AND RECOMPACTED TO AT LEAST NINETY PERCENT (90%) OF MAXIMUM DRY DENSITY.
34. ALL FILL AREAS TO BE CLEARED OF ALL VEGETATION AND OTHER UNSUITABLE MATERIAL FOR A STRUCTURAL FILL AND THE AREA SCARIFIED TO A DEPTH OF 6".
35. FILL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 6" IN COMPACTED THICKNESS AND COMPACTED AT OPTIMUM MOISTURE CONTENT BY APPROVED METHOD.
36. ALL FILL TO BE COMPACTED TO A MINIMUM OF 90% MAXIMUM DENSITY AS DETERMINED BY U.B.C. STANDARDS AND SO CERTIFIED BY TESTS AND REPORTS FROM THE SOILS ENGINEER.
37. ALL SLOPES IN EXCESS OF 3 FEET IN VERTICAL HEIGHT TO BE PREPARED AND MAINTAINED TO CONTROL AGAINST EROSION.
38. UNAUTHORIZED CHANGES AND USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ANY AND ALL CHANGES TO THESE PLANS MUST BE APPROVED BY PINNACLE ENGINEERING.

THE FOLLOWING CITY OF ARVIN STANDARD DRAWINGS SHALL BE CONSIDERED A PART OF THESE PLANS. (CONTRACTOR TO OBTAIN LATEST EDITION THEREOF)

	CITY STD. NO.	DESCRIPTION		CITY STD. NO.	DESCRIPTION
☐	S-1	TYPICAL SEWER LATERAL	☒	W-1	WATER/SEWER PIPE BEDDING AND BACKFILL DETAILS
☐	S-2	TYPICAL HOUSE CONNECTION	☐	W-2	STANDARD WATER SERVICE
☒	S-3	INLINE CLEAN-OUT	☐	W-3	STANDARD WATER METER
☒	S-4	END OF LINE CLEAN-OUT	☐	W-4	STANDARD FIRE HYDRANT ASSEMBLY
☒	S-5	48" I.D. STANDARD MANHOLE	☐	W-5	BLOWOFF ASSEMBLY
☒	S-6	60" I.D. STANDARD MANHOLE	☒	W-6	VALVE BOX ASSEMBLY
☒	S-7	MANHOLE FRAME AND COVER	☐	W-7	STEEL CASING FOR WATER PIPE
☒	S-8	MANHOLE- DROP INLET	☒	W-8	TYPICAL THRUST BLOCK DETAILS
☒	S-9	STANDARD CHIMNEY	☒	R-1	TYPICAL STREET SECTIONS
☐	S-10	STEEL CASING FOR SEWER PIPE	☒	R-2	AC OVERLAY & PATCH DETAILS
☐	D-1	JUNCTION MANHOLE DETAIL	☐	R-3	CURB, GUTTER, SIDEWALK & WHEELCHAIR RAMP DETAILS
☐	D-2	CATCH BASIN DETAIL	☒	R-4	DRIVEWAY APPROACH DETAILS
☐	D-3	CATCH BASIN DETAIL	☐	R-5	CROSS GUTTER & SURVEY MONUMENT DETAILS
☐	D-4	MISCELLANEOUS DRAINAGE DETAILS	☐	R-6	STANDARD STREET SIGN DETAIL
☒	D-8	CHAIN LINK FENCE	☐	R-7	STANDARD STOP SIGN DETAIL
☒	D-9	CHAIN LINK GATES	☐	R-8	STANDARD END OF ROAD SIGN DETAIL

REGISTERED PROFESSIONAL ENGINEER · MATTHEW K. VOVILLA · RCE 43130 · Exp. 3-31-06 · CIVIL · STATE OF CALIFORNIA

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MATTHEW K. VOVILLA 3-28-05
RCE 43130 EXP. 3/31/06
DATE

REVISIONS

SEWER AND LIFT STATION PLANS
GENERAL NOTES
ARVIN, CALIFORNIA

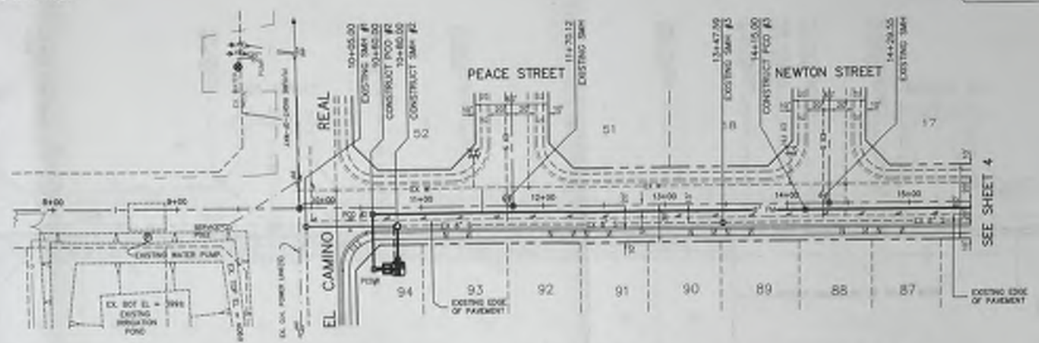
JOB No.:	04-147A
DWG NO.:	04147GN03
DATE:	03/28/05
DRAWN BY:	JV
CHECKED BY:	MKV
SHEET	2 OF 11 SHEETS

LEGEND

- PROPOSED SEWER MANHOLE w/NUMBER
- PROPOSED SEWER CLEANOUT w/NUMBER
- 8" S — PROPOSED SEWER LINE w/SIZE
- PROPOSED RIGHT-OF-WAY
- 6" FM — PROPOSED FORCE MAIN w/SIZE
- PROPOSED FORCE MAIN CLEAN-OUT
- EXISTING WATERLINE (SHOWN FOR INFORMATION ONLY)
- EXISTING SEWER MANHOLE
- EXISTING SEWER CLEANOUT
- EXISTING SEWER MAIN

SPECIAL INSTALLATION NOTE:

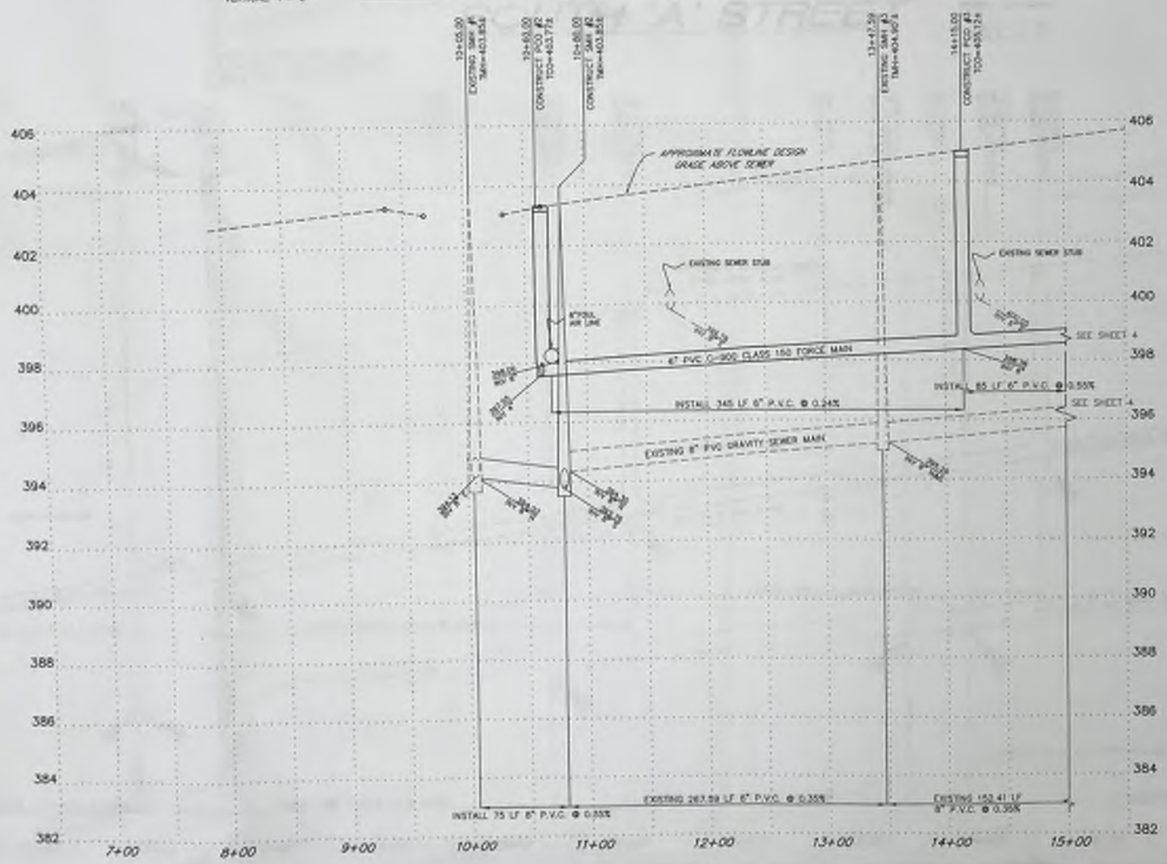
IN ACCORDANCE WITH THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICE STANDARDS, WATER MAINS SHALL NOT BE INSTALLED WITHIN 10 FEET HORIZONTALLY OR VERTICALLY WITHIN 4 INCHES OF SEWER MAINS. IN ADDITION, IF WATER MAINS ARE INSTALLED 1 FOOT VERTICALLY BELOW OR ABOVE SEWER MAINS, CLASS 200 PRESSURE RATED PVC WATER PIPE (DR 14 PER AWWA C900-87), OR OTHER PIPE MATERIAL AS SPECIFIED BY SAID STATE OF CALIFORNIA STANDARDS SHALL BE INSTALLED. THIS CRITERIA SHALL APPLY TO WATER MAINS THAT CROSS BELOW SEWER HOUSE LATERALS, BUT NOT TO WATER MAINS THAT CROSS ABOVE SEWER HOUSE LATERALS.



HORIZONTAL: 1" = 50'
VERTICAL: 1" = 2'

SOUTH 'A' STREET

NOTE: SEE TRACT 6175 SEWER AND STORM DRAIN PLANS FOR GRAVITY SEWER WITHIN TRACT LIMITS.



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REGISTERED PROFESSIONAL ENGINEER — MATTHEW K. VERELLA — REG. 43133 — Exp. 3-31-06 — CIVIL — STATE OF CALIFORNIA

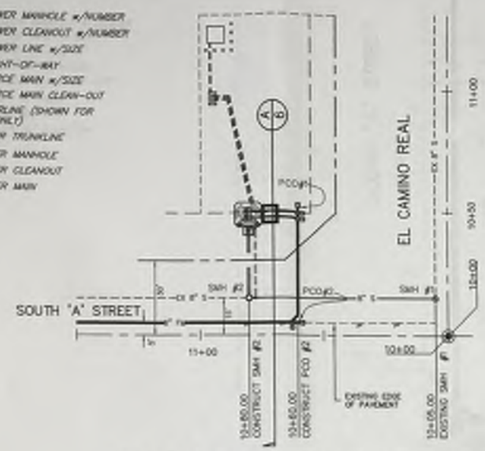
MATTHEW K. VERELLA	DATE
REVISIONS	

SEWER AND PUMP STATION PLANS
SOUTH 'A' STREET
ARVIN, CALIFORNIA

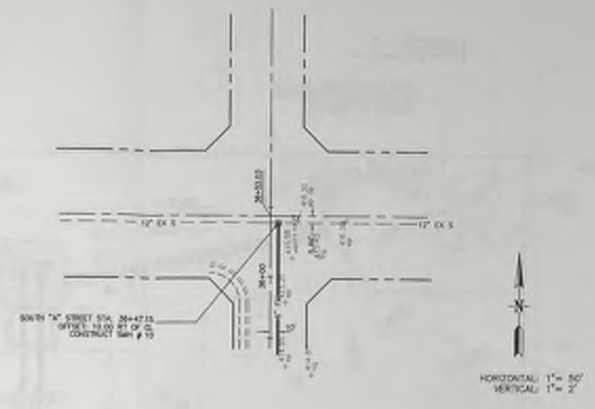
JOB No.:	04-1474
DWG NO.:	04147SW01
DATE:	03/08/05
DRAWN BY:	JV
CHECKED BY:	MKV
SHEET	3 OF 11 SHEETS

LEGEND

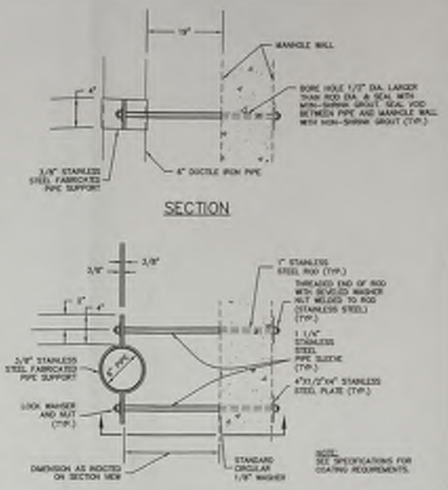
- PROPOSED SEWER MANHOLE w/NUMBER
- PROPOSED SEWER CLEANOUT w/NUMBER
- PROPOSED SEWER LINE w/SIZE
- PROPOSED RIGHT-OF-WAY
- PROPOSED FORCE MAIN w/SIZE
- PROPOSED FORCE MAIN CLEAN-OUT
- EXISTING WATERLINE (SHOWN FOR INFORMATION ONLY)
- EXISTING SEWER TRUNKLINE
- EXISTING SEWER MANHOLE
- EXISTING SEWER CLEANOUT
- EXISTING SEWER MAIN



SOUTH 'A' STREET

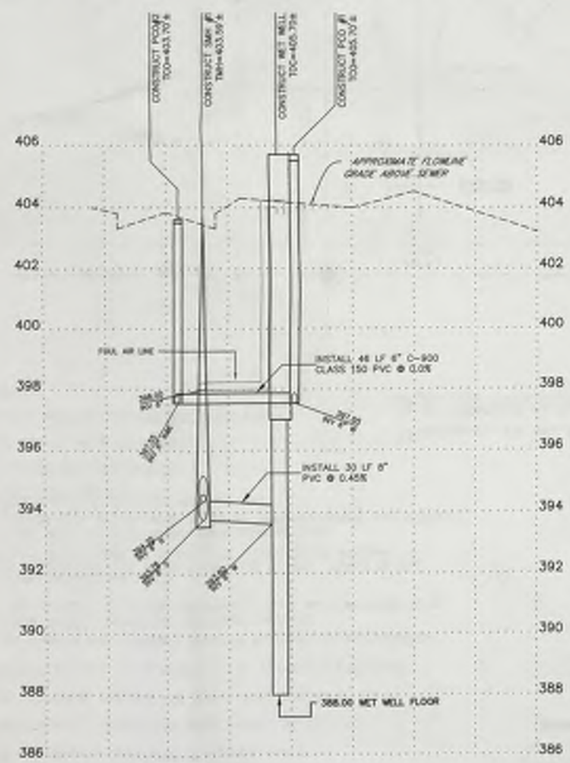


SYCAMORE DRIVE

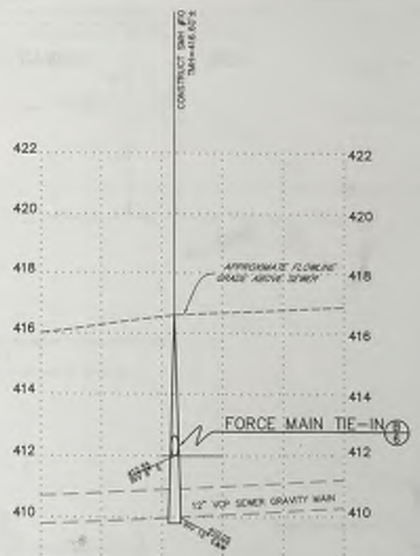


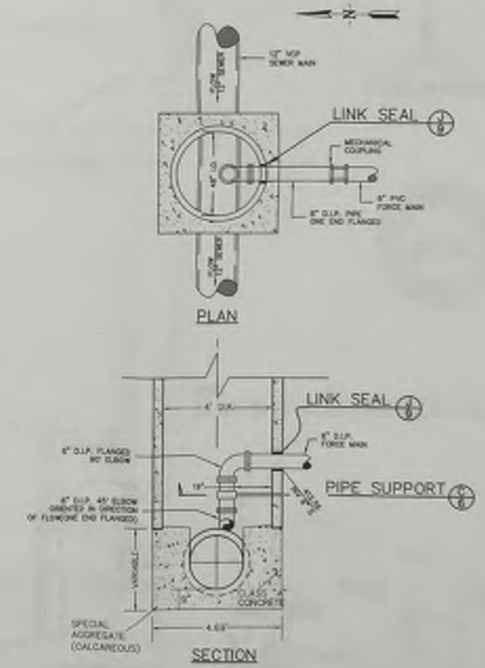
C/6 PIPE SUPPORT DETAIL

NOT TO SCALE



A/6 LIFT STATION TIE IN DETAIL





B/6 SMH# 10 – FORCE MAIN TIE-IN

NOT TO SCALE

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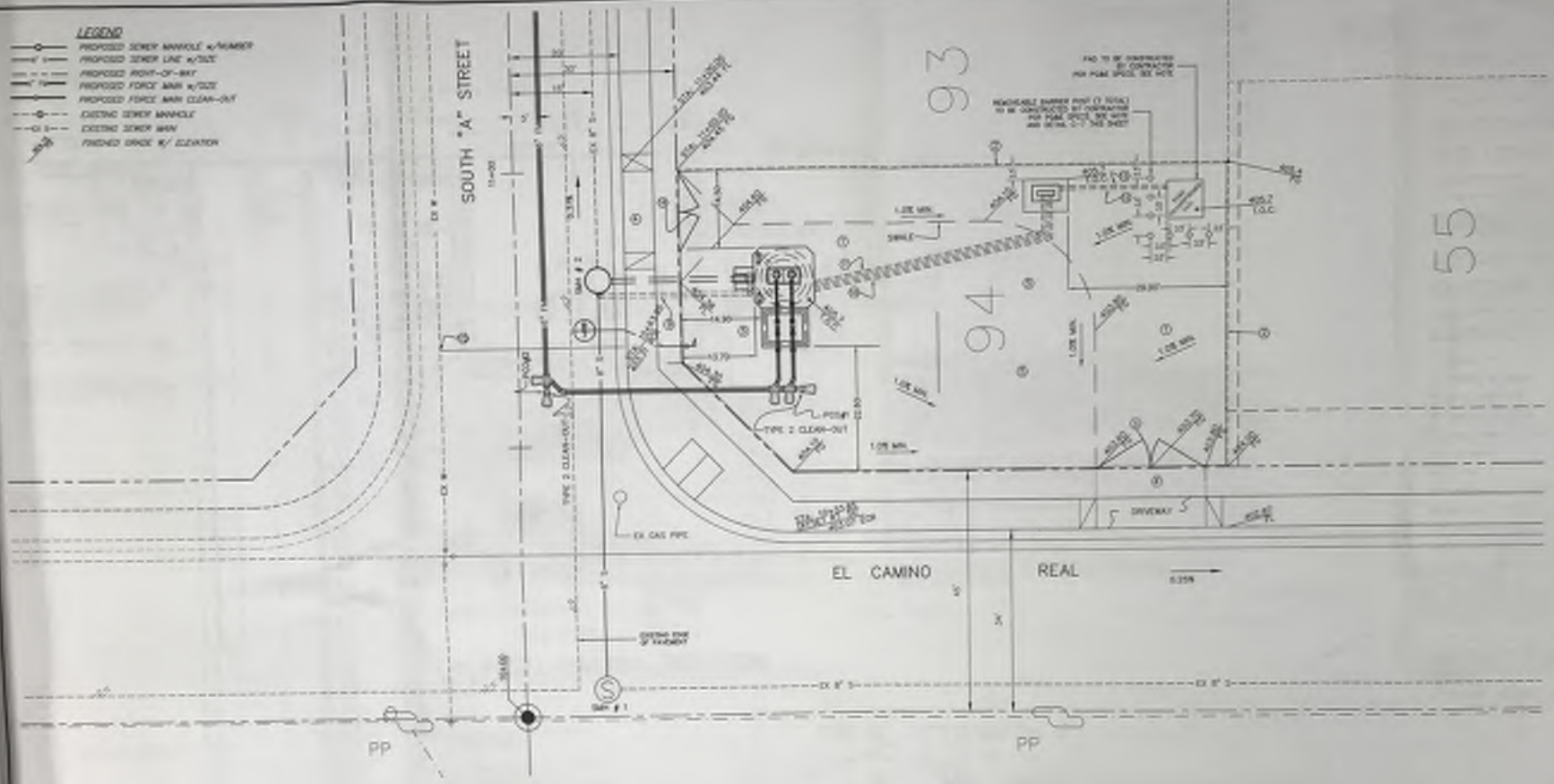
MATTHEW K. VERELLA — REG. 43130 EXP. 3/31/06

REVISIONS	DATE

SEWER AND PUMP STATION PLANS SOUTH 'A' STREET AND SYCAMORE DRIVE ARVIN, CALIFORNIA

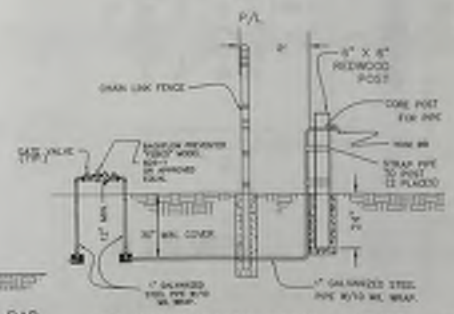
JOB No.:	04-1478
DWG NO.:	04174478ST
DATE:	02/28/05
DRAWN BY:	JV
CHECKED BY:	MKV
SHEET	6
OF 11	SHEETS



CONSTRUCTION NOTES (THIS SHEET ONLY)

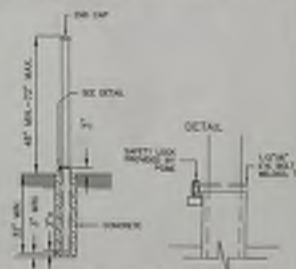
1. GRADE SITE TO SLOPE A MINIMUM OF 1 PERCENT TOWARDS SOUTHEAST GATE.
2. CONSTRUCT CHAIN LINK FENCE PER CITY OF ARVIN STANDARD D-8.
3. CONSTRUCT 20' WIDE GATES PER CITY OF ARVIN STANDARD D-9.
4. CONSTRUCT DRIVEWAY APPROACH PER C.O.A. STD. R-4. DRIVEWAY SLOPES SHALL BE A MAXIMUM OF 10 PERCENT TO RIGHT OF WAY.
5. PLACE 4" DEPTH OF 3/4" INCH CRUSHED ROCK WITHIN LIMITS OF FENCE. FINISHED GRADE "FG" INDICATES "TOP OF ROCK" ELEVATION. DIRT GRADE SHALL BE 0.33' LOWER THAN FINISHED GRADE.
6. ENTIRE SITE SHALL BE OVEREXCAVATED OR SCARIFIED TO A DEPTH OF 1 FOOT BELOW NATURAL GROUND, AND RECOMPACTED TO 90 PERCENT RELATIVE DENSITY PER ASTM D-1557. LIMITS OF SITE PREPARATION SHALL EXTEND TO 5-FEET BEYOND THE FENCE.
7. ALL EMBANKMENT AND BACKFILL FOR TRENCHES OR OTHER EXCAVATIONS SHALL BE COMPACTED TO 90 PERCENT RELATIVE DENSITY PER ASTM D-1557 (EXCEPT AS OTHERWISE SPECIFIED).
8. IMPORTED MATERIAL, INCLUDING THE BORROW SITE LOCATION, SHALL BE APPROVED BY THE ENGINEER.
9. THE FOUL AIR LINE SHALL BE CONSTRUCTED WITH A CONTINUOUS SLOPE TOWARDS THE MANHOLE.
10. INSTALL (2) 2-INCH SCHEDULE 80 ELECTRICAL CONDUITS FOR LIQUID LEVEL CONTROLS.
11. INSTALL (2) 2-INCH SCHEDULE 80 ELECTRICAL CONDUIT FOR PUMP POWER CABLES.
12. INSTALL (1) 1-INCH SCHEDULE 80 PVC CONDUIT FOR FUTURE TELEPHONE CABLE.
13. INSTALL (1) 2-INCH SCHEDULE 80 PVC ELECTRICAL CONDUIT WITH PULL STRING FOR POWER. REFER TO PG&E STANDARDS FOR EXACT CONDUIT STUB-UP LOCATION. SEE ALSO PG&E ELECTRICAL PLAN.
14. ALSO SEE STREET IMPROVEMENT PLANS FOR TRACT 6175 FOR ADDITIONAL DESIGN CRITERIA OF SOUTH "A" STREET AND EL CAMINO REAL.
15. "HOT TAP" WATER SERVICE INTO EXISTING WATER MAIN. PATCH EXISTING IN ACCORDANCE W/ CITY OF ARVIN STD. R-2.
16. CONSTRUCT 14.5' WIDE DOUBLE GATE PER CITY OF ARVIN STD. D-9.

TYPICAL GRADING SECTION – ⊕ STATION PAD



WATER SERVICE DETAIL – FUTURE

NOTE:
SEE PG&E ELEC. AND GAS REQUIREMENTS SECTION 4 UG-1 AND UG-4 FOR PAD DIMENSIONS AND BARRIER POST DETAILS.



REMOVEABLE BARRIER POST

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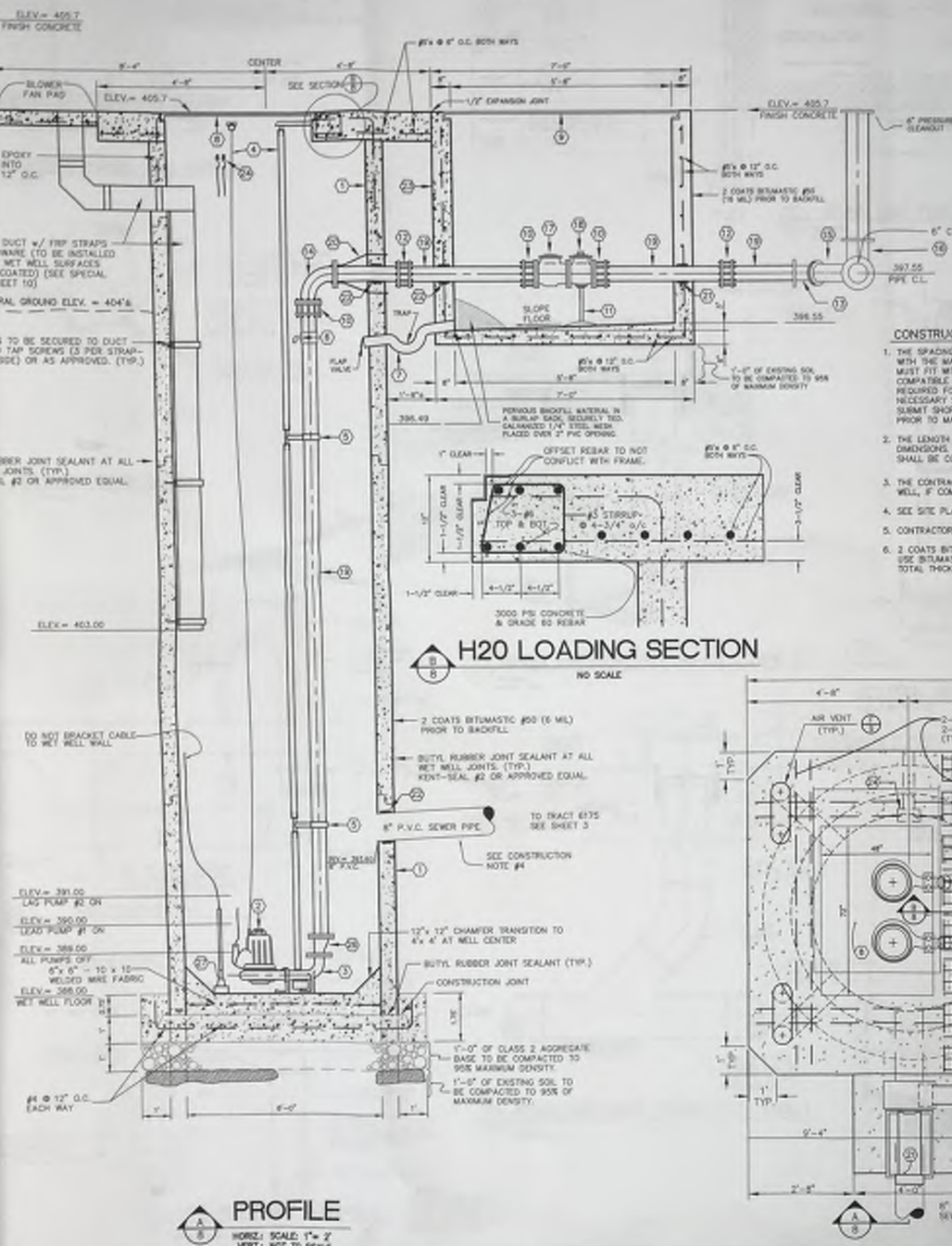
REVISIONS | DATE

REGISTERED PROFESSIONAL ENGINEER MATTHEW K. FERULA RCE 43130 Exp. 3-31-08 CIVIL STATE OF CALIFORNIA

SEWER AND PUMP STATION PLANS
PUMP STATION SITE PLAN
ARVIN, CALIFORNIA

JOB NO.: 04-7434
DWG NO.: 04W1W001
DATE: 03-08-05
DRAWN BY: JT
CHECKED BY: MKF
SHEET 7 OF 12



PUMP OPERATION CONDITIONS	
SIZE	4 INCH DISCHARGE
CAPACITY	270 G.P.M.*
TOTAL DYNAMIC HEAD	45.5 FEET
HORSE POWER	6H.P.
PUMP SPEED	1750 R.P.M.
POWER SUPPLY	3ø, 240V

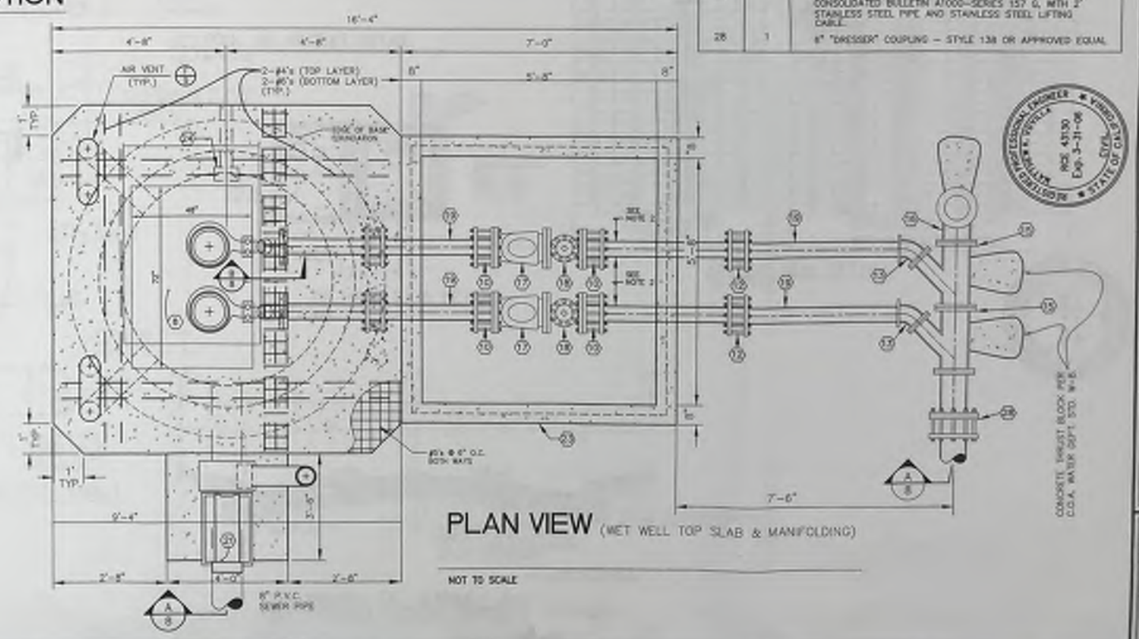
*(2) PUMPS REQUIRED AT 270 G.P.M. EACH

CONSTRUCTION NOTES: (THIS SHEET ONLY)

1. THE SPACING BETWEEN PUMPS, AND ORIENTATION OF PUMPS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. HOWEVER, THE PUMPS AND PIPING MUST FIT WITHIN THE DESIGNATED WET WELL. THE WET WELL HATCH MUST BE COMPATIBLE WITH THE PROPOSED PUMPS. DEPENDING UPON SPACING AND ORIENTATION REQUIRED FOR THE SELECTED PUMPS, THE CONTRACTOR SHALL FURNISH AND INSTALL ANY NECESSARY SPACERS OR SHORT SPOOLS TO INSTALL PIPING. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF ALL PROPOSED EQUIPMENT TO THE ENGINEER FOR APPROVAL PRIOR TO MAKING PURCHASES.
2. THE LENGTH AND WIDTH SHOWN FOR THE WET WELL ACCESS HATCH ARE MINIMUM DIMENSIONS. THE ACTUAL DIMENSIONS AND EXACT PLACEMENT OF THE HATCH SHALL BE COMPATIBLE WITH THE PROPOSED PUMPS.
3. THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE BID FOR A SMALLER OR LARGER WET WELL, IF COMPATIBLE WITH PROPOSED PUMPS.
4. SEE SITE PLAN FOR ACTUAL ORIENTATION INTO WET WELL.
5. CONTRACTOR SHALL MAKE AN INDEPENDENT ESTIMATE OF ALL QUANTITIES.
6. 2 COATS BITUMASTIC 300M ON ALL INTERIOR SURFACES, EXCEPT PVC LINER. USE BITUMASTIC 300M RED FOR FIRST COAT, BLACK FOR SECOND COAT. TOTAL THICKNESS = 16 MIL.

LIST OF MATERIALS

ITEM	QTY. (NOTE 5)	DESCRIPTION
1	18.0 LF	72" I.D. R.C.P. - PVC LINED - "A" LOCK SEE SPECIFICATIONS.
2	2	FAIRBANKS-MORSE, WEMCO or MYERS PUMP
3	2	4" DISCHARGE CONNECTION, DEPENDENT ON PUMP TYPE.
4	2	2" 304 STAINLESS STEEL GUIDE BAR ASSEMBLY AND STAINLESS STEEL LIFTING CABLE.
5	4	INTERMEDIATE GUIDE BAR BRACKET (APPROX. 9.5' SPACING - 2 PER PUMP)
6	2	WASH DOWN ASSEMBLY - SEE DETAIL
7	1	2" SCH. 80 PVC DRAIN PIPE
8	1	WET WELL ACCESS DOOR - HEAVY DUTY H20 LOADING, HALLIDAY PRODUCTS H2R7248, OR APPROVED EQUAL. 72" X 48" CLEAR OPENING. SEE NOTE 2.
9	1	VALVE BOX ACCESS HATCH - HEAVY DUTY H20 LOADING HALLIDAY PRODUCTS OR APPROVED EQUAL.
10	6	4" CAST IRON FLANGED ADAPTER - "DRESSER" STYLE 127 OR APPROVED EQUAL
11	2	VALVE SUPPORTS PER MANUFACTURER
12	4	4" "DRESSER" COUPLING - STYLE 138 OR APPROVED EQUAL
13	2	4" FLANGED 45°
14	2	4" FLANGED 90° ELBOW
15	2	6"x 4" FLANGED WYE
16	2	6" FLANGED 45° ELBOW
17	2	4" CHECK VALVE (EXTERNAL SPRING/LEVER TYPE)
18	2	4" PLUG VALVE
19	60 LF	4" D.I. PIPE
20	2	PIPE RESTRAINT ASSEMBLY - SEE DETAIL
21	1	BLOWER FAN - "ODLCOTE" CLAMP-10
22	10	LINK-SEAL WATER STOP - DETAIL
23	1	REINFORCED CONCRETE VALVE BOX, CAST IN PLACE
24	2	HANGERS FOR EACH POWER CABLE. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
25	1	"TESCO" LIQUITRONICS III LEVEL CONTROLLER OR CONSOLIDATED ELECTRIC CONTROLLER IN NEMA 312 & 12 RATED CONTROLLER CABINET w/ P.G.&E. METER SECTION (NOT SHOWN) - SEE SPECIFICATIONS FOR ADDITIONAL EQUIPMENT & REQUIREMENTS.
26	2	4"-6" FLANGED ECCENTRIC REDUCER (IF REQUIRED)
27	1	SUBMERSIBLE LEVEL TRANSDUCER. CONSOLIDATED BULLETIN A7000-SERIES 157 G, WITH 2" STAINLESS STEEL PIPE AND STAINLESS STEEL LIFTING CABLE.
28	1	6" "DRESSER" COUPLING - STYLE 138 OR APPROVED EQUAL



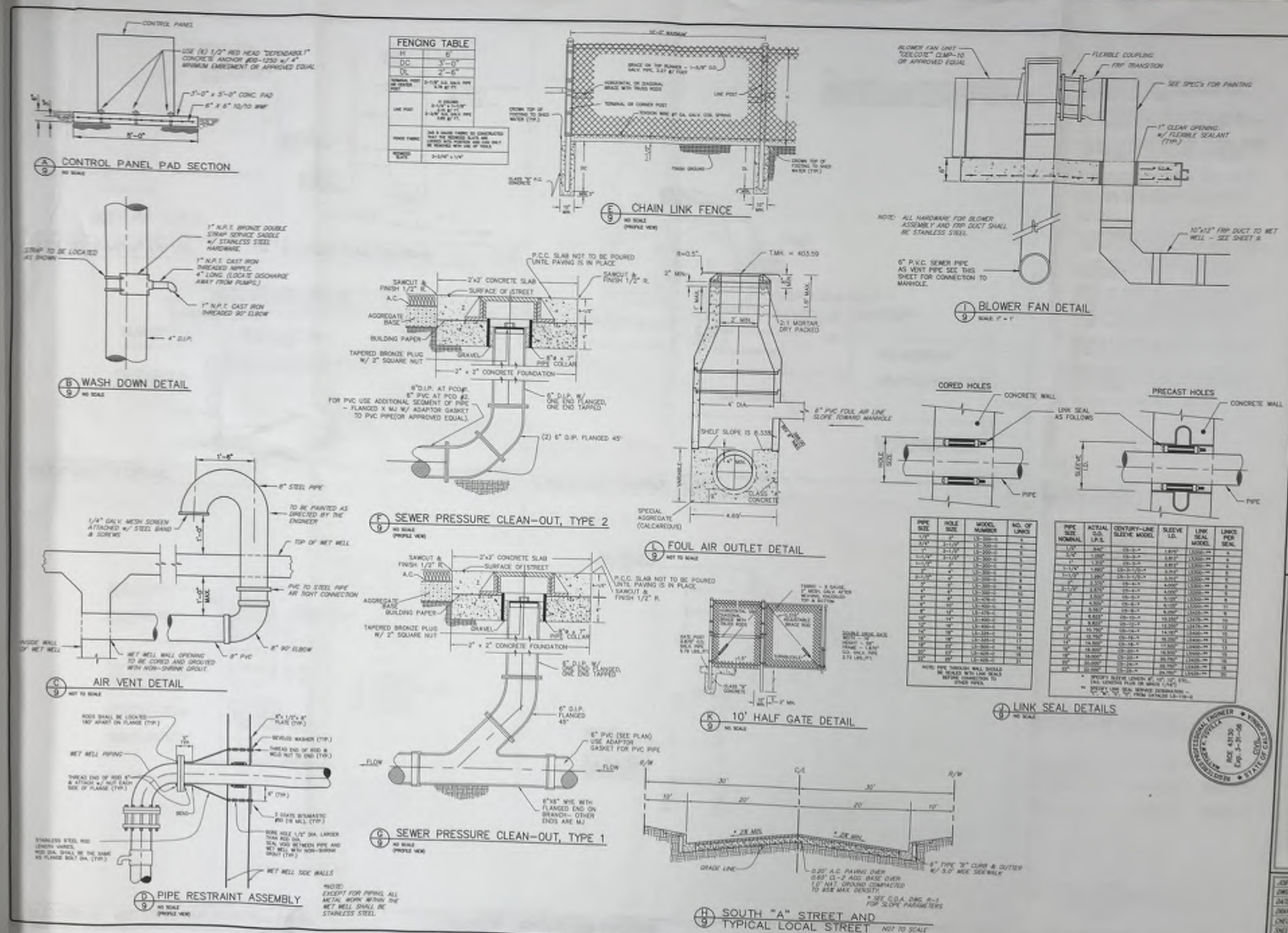
PINNACLE Engineering
1712 19th Street, Suite 101, Bakersfield, CA 93301
Phone: (661) 869-0184 Fax: (661) 328-0807

MATTHEW K. KOVALA RCE 43130 EXP. 3/31/06

REVISIONS	DATE

SEWER AND PUMP STATION PLANS
SEWER LIFT STATION
WET WELL AND PUMP DETAILS

JOB NO.:	04-1474
DWG NO.:	0414709W03
DATE:	03/28/05
DRAWN BY:	JY
CHECKED BY:	MKY
SHEET	8
OF 11	SHEETS



PIPE SIZE	HOLE SIZE	MODEL NUMBER	NO. OF LINKS
1/2"	9"	LS-300-9	4
3/4"	9"	LS-300-9	4
1"	9"	LS-300-9	4
1-1/4"	9"	LS-300-9	4
1-1/2"	9"	LS-300-9	4
2"	9"	LS-300-9	4
2-1/2"	9"	LS-300-9	4
3"	9"	LS-300-9	4
4"	9"	LS-300-9	4
5"	9"	LS-300-9	4
6"	9"	LS-300-9	4
8"	9"	LS-300-9	4
10"	13"	LS-400-13	6
12"	13"	LS-400-13	6
14"	15"	LS-400-15	8
16"	15"	LS-400-15	8
18"	15"	LS-400-15	8
20"	15"	LS-400-15	8
22"	15"	LS-400-15	8
24"	15"	LS-400-15	8
30"	15"	LS-400-15	8
32"	15"	LS-400-15	8
36"	15"	LS-400-15	8

NOTE: PIPE THROUGH WALL SHOULD BE SEALED WITH LINK SEALS BEFORE CONNECTION TO OTHER PIPES.

PIPE SIZE NOMINAL	ACTUAL O.D. I.P.S.	CENTURY-LINE SLEEVE MODEL	SLEEVE I.D.	LINK SEAL MODEL	LINKS PER SEAL
1/2"	.840"	CS-3-4	1.875"	LS300-**	4
3/4"	1.050"	CS-3-4	2.063"	LS300-**	4
1"	1.315"	CS-3-4	2.313"	LS300-**	4
1-1/4"	1.660"	CS-3-4/CS-4	2.625"	LS300-**	4
1-1/2"	1.900"	CS-3-4/CS-4	2.813"	LS300-**	4
2"	2.375"	CS-3-4	3.313"	LS300-**	4
2-1/2"	2.875"	CS-4-4	4.000"	LS300-**	4
3"	3.500"	CS-4-4	4.688"	LS300-**	4
4"	4.500"	CS-4-4	5.750"	LS300-**	4
5"	5.563"	CS-6-4	6.875"	LS300-**	4
6"	6.625"	CS-6-4	8.000"	LS300-**	4
8"	8.625"	CS-10-4	10.250"	LS400-**	6
10"	10.750"	CS-12-4	12.375"	LS400-**	6
12"	12.750"	CS-14-4	14.187"	LS400-**	6
14"	14.000"	CS-16-4	15.500"	LS400-**	6
16"	16.000"	CS-18-4	17.500"	LS400-**	6
18"	18.000"	CS-20-4	19.500"	LS400-**	6
20"	20.000"	CS-22-4	21.750"	LS400-**	6
22"	22.000"	CS-24-4	23.750"	LS400-**	6
24"	24.000"	CS-26-4	25.750"	LS400-**	6

* SPECIFY SLEEVE LENGTH 8", 12", 12", ETC. (ALL LENGTHS PLUS OR MINUS 1/16")

** SPECIFY LINK SEAL SERIES DESIGNATION - "S", "M", "L", "I", FROM CATALOG LS-110-E

PINNACLE *Engineering*

1712 19th Street, Suite 101, Bakersfield, CA 93301

Phone: (661) 869-0184 Fax: (661) 323-0[illegible]

MATTHEW K. VIVALLA

REVISIONS

DATE

SEWER AND PUMP STATION PLANS
SEWER LIFT STATION
WET WELL AND PUMP DETAILS

JOB NO.:	04-1474
DWG NO.:	04147401
DATE:	03/28/05
DRAWN BY:	JV
CHECKED BY:	MKV
SHEET	9
OF 11	SHEETS

ATTACHMENT D
Pump Station Submittal

FLO-SYSTEMS, INC.
3010 Floyd St. • Burbank, California 91504-2599 • (818) 562-5282 • FAX (818) 842-3217
www.flo-systems.net

RECORD - SUBMITTAL

Fairbanks Morse Pumps
Model 5433 MVK
Tract 6175
Arvin, CA

Fairbanks Morse
3601 Fairbanks Avenue
Kansas City, KS 66106
Phone 913/371-5000

USFilter Controls
1239 Willow Lake Blvd.
Vadnais Heights, MN 55110
Phone 651/766-2700

Manufacturers Representative
For Parts and Service
Flo-Systems, Inc.
3010 Floyd Street
Burbank, CA 91504
Phone 818/562-5282 Fax 818/842-3217

Job No. 5R328

Flo-Systems, Inc.

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Fairbanks Morse

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Pump Curve	1 Page
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Paint Specifications	1 Page
Motor Information	5 Pages

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Ceilcote

Drawings	2 Pages

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Halliday Access Covers

Drawings	2 Pages

FLO-SYSTEMS, INC.
3010 Floyd St. • Burbank, California 91504-2599 • (818) 562-5282 • FAX (818) 842-3217
www.flo-systems.net

Arvin, California
SANITARY LIFT STATION EQUIPMENT

Supplied by
Flo-Systems, Inc.

ONE (1)	Fairbanks Morse 4" model 5433MVK explosion proof submersible pump with 10 HP, 3/60/460 volt motors to provide a design of 270 GPM @ 49 ft. TDH. Includes 60 ft. motor lead, includes: base elbows, slide, SST upper brackets, 316 SST guide rails and SST lifting cables.
ONE (1)	USFilter 153 series duplex control panel with free standing NEMA 3R enclosure
ONE (1)	Submersible transducer with 50 ft. power cable
TWO (2)	9G EF Normally open float switches with 60 ft. cable
ONE (1)	Ceilcote CLMP – 10 blower with Class 1 construction rating to provide 1900 ACFM at 1.5" WC with 1.5 HP, 1/60/230 volt motor.
ONE (1)	Lot of fiberglass ducting as shown in the submittal drawings
ONE (1)	60" x 48" Halliday access cover with bituminous coating, recessed lock box, with plastic PVC splatter protection dual door

Fairbanks Morse Pump Corporation
General Clarifications

1. The supply and installation of the following items are by others unless otherwise identified in this submittal.
   - Anchor bolts, nuts and washers
   - Gauges, valves and miscellaneous fittings and adapters.
   - Connecting piping and/or supports
   - Maintenance lubrication piping and related equipment.
   - System control apparatus
   - Maintenance tools and/or storage boxes.
   - Equipment tags.
   - Installation or field performance testing.
2. The following information is required by Fairbanks Morse prior to or at release of the pumps to production.
   - Verification of rotation and discharge position.

Fairbanks Morse Pump
Submittal Data
For
City Of Arvin
Arvin, Ca.

Supplier:	Flo-Systems, Inc.
Manufacturer:	
Pump & Motor	Fairbanks Morse Pump Corporation 3601 Fairbanks Ave. Kansas City, Kansas 66106-0906 (913) 371-5000 Fax: (913) 371-2272
Project Number:	088887
Sales Order Number:	1796290 SC
Service:	WWTP
Quantity:	2
Pump Size & Model:	4" D5433MV

Fairbanks Morse Pump
Submittal Table Of Contents

Pump:
Features

Technical Clarifications....C&E-5000
Bearing Life Statement....Pg. 1 of 1
Performance Curve....088887C
Setting Plan....088887SP
Material Specifications....MI-D5430
Assembly Drawing....543MA005
Top & Intermediate Guide Bracket Assembly....IGB-468
Intermediate Guide Bracket Detail....IGB-54MV
Pump Technical Data....TD-D5430
Paint Specifications....PC-1000
Motor Performance Data Sheet....GMD21UC05
Motor Cable Specifications....MC-1000
Motor Illustration....DSUBM011
Wiring Diagram....543MM001-1
Terminal Board Connection....543MM015-3

Fairbanks Morse Pump
Included Features

- Fairbanks Morse Submersible Motor
- U L Listed, Explosion Proof, Class 1, Division 1, Groups C & D
- Characteristics
  HP 10
  RPM 1200
  Ph/Hz/Volt 3/60/460
  Short Time In Air Duty
- Mechanical Seal
  Outer Seal
    Silicon Carbide Vs Tungsten Carbide
  Inner Seal:
    Carbon Vs Ni-Resist
- Winding Thermostats
- Moisture Detectors
- Stainless Steel Bolting
- Power Cable Length, Ft. 60
- Lifting Bail
- 1- Coat Paint System
- "K" – Bladeless Impeller
- Certified Impeller Dynamic Balance
- 4 x 4 Elbow
- Stainless Steel Top & Intermediate Guide Brackets

1. Submersible motors are supplied with moisture detectors as standard equipment. A compatible controller must be connected to properly protect the motor. If a controller is not connected, the manufacturer's warranty is invalid.

Fairbanks Morse Pump
A Member of Pentair Pump Group

Shaft Deflection & Bearing Life
Submersible Pumps

August 3, 2005

KP or SN: 88880

Customer Information:

Customer:
Job Name:
Tag Name:

Application Data:

Pump Model:	4"5433mvK
Impeller Curve Symbol:	T4C1AA
Impeller Diameter:	11.6 Inches
Capacity:	270 GPM
Head:	49 Feet
Speed:	1155 RPM
Specific Gravity:	1
Motor Frame Size:	210
Motor Horse Power:	10

Bearing Life & Shaft Deflection:

L10 Thrust Bearing Life:	250900 Hours
L10 Radial Bearing Life:	3277600 Hours
Shaft Deflection, Seal Face:	0.0019 Inches

Weight Moment of Inertia:

WR Squared, Motor:	1.1 Lbs-Ft^2
WR Squared, Impeller:	7 Lbs-Ft^2
Total:	8.2 Lbs-Ft^2

Prepared By: JES

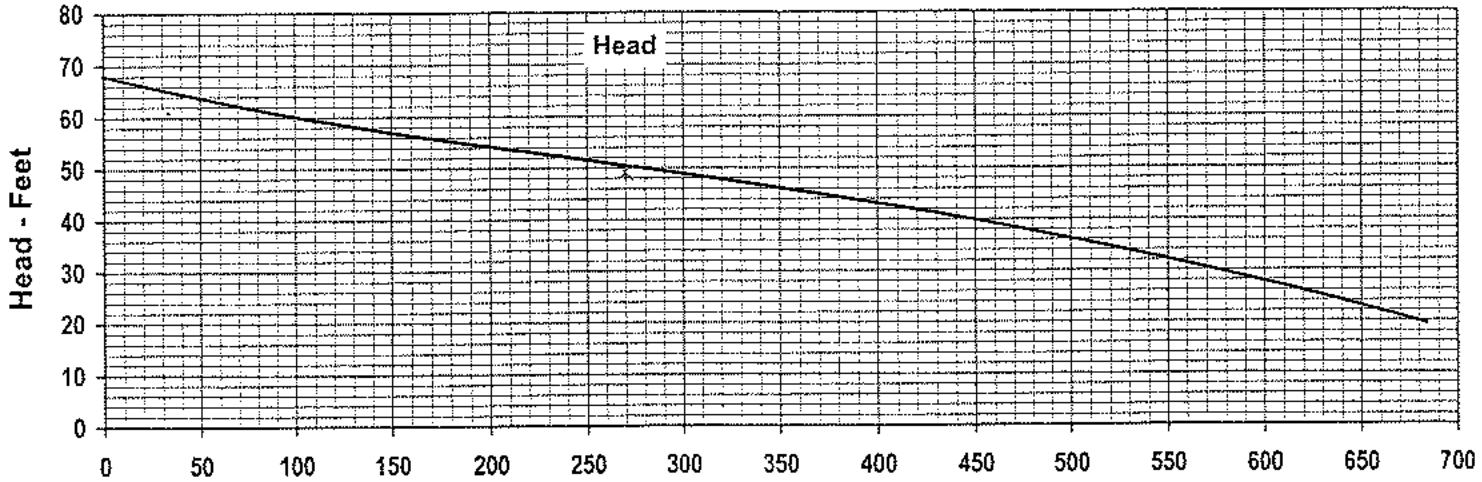
Fairbanks Morse
Pentair Water

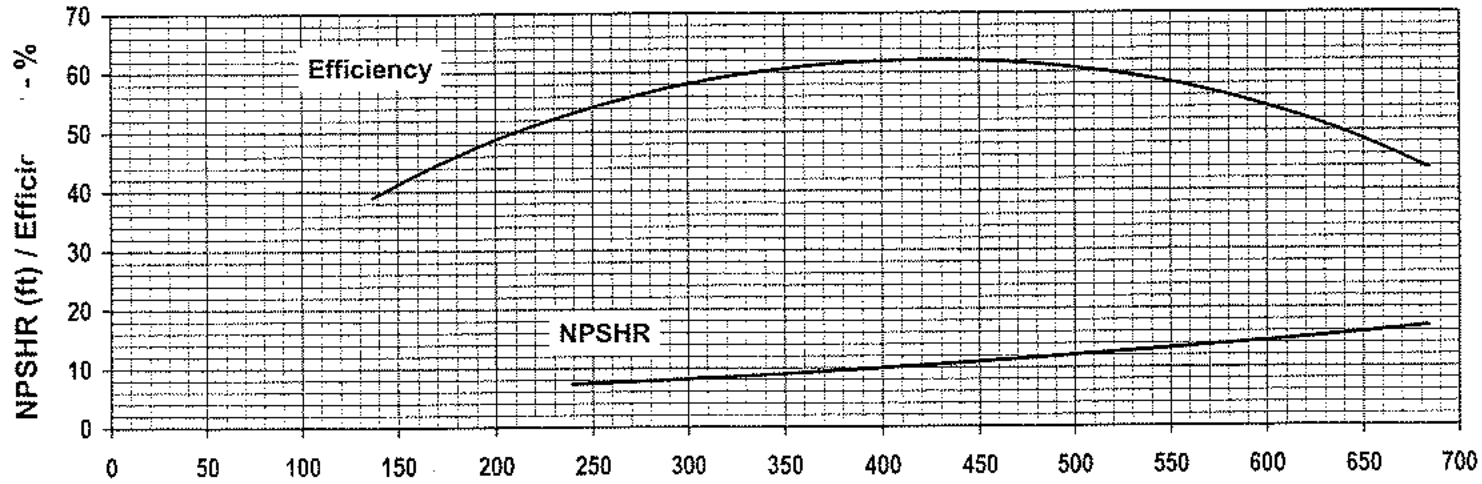
4" D5433MVK SUBMITTAL CURVE

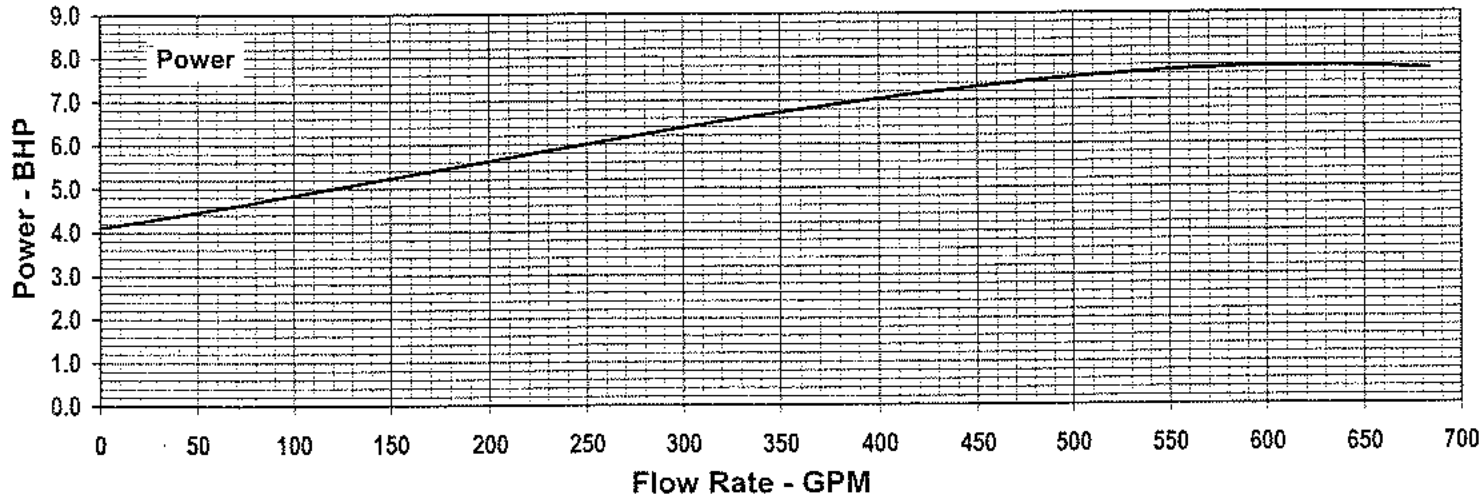
SPEED	IMPELLER	DIAMETER	VANES	GUARANTEED VALUES			
1155	T4C1AA	11.60	ONE	FLOW	HEAD	EFF.	BHP
SPHERE	DRIVER	DATE	BY	270	49	-----	-----
3.00"	10	8/3/2005	JES	-----	-----	-----	-----
				-----	-----	-----	-----
				-----	-----	-----	-----

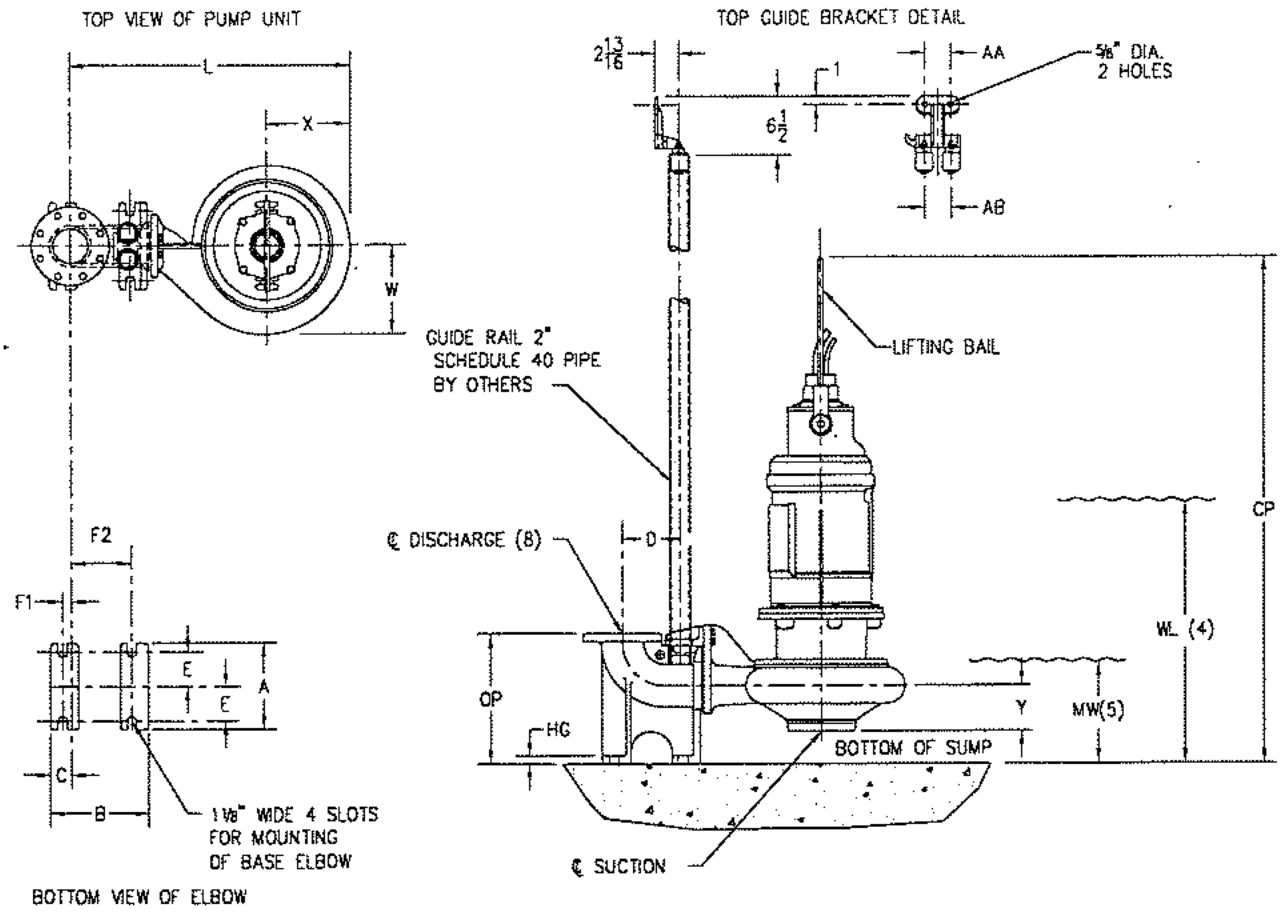
THIS CURVE IS BASED ON THE ACTUAL TEST PERFORMANCE OF A SIMILAR PUMP. ONLY THE INDICATED POINT(S) IS GUARANTEED.

CURVE NO.:	088887C
REV.	
PROJECT NO.:	088887









PUMP	MOTOR FRAME	DISCH	A	B	C	D	E	F1	F2	L	W	X	Y	AA	AB	CP	HG	MW	OP	WL
4" D5433MV	210T	4	10	11 3/8	2 3/8	6 3/4	4	1	7	32 3/4	10 5/8	9 3/4	5 1/4	3	3 1/8	54 7/8	7/8	12	15	32

NOTES:

(1) DISCHARGE FLANGE IS 125# ANSI DRILLING UNLESS NOTED.
(2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
(3) 5400'S AND 5400K'S ARE DIMENSIONALLY IDENTICAL.
(4) RECOMMENDED LOW WATER LEVEL FOR CONTINUOUS OPERATION. 210 FRAME AND WATER JACKETED 250 THRU 440 FRAME UNITS CAN OPERATE CONTINUOUSLY AT "MW" WATER LEVEL.
(5) WATER LEVEL MAY BE DRAWN DOWN TO THIS LEVEL FOR SHORT TIME DUTY IN AIR MOTOR RATINGS. DRAW DOWN CAN OCCUR OVER A PERIOD OF 15 MINUTES.
(6) BASES ARE DESIGNED TO HAVE FULL CONTACT WITH GROUT OR A SOLE PLATE GROUTED IN PLACE.
(7) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VARY DUE TO NORMAL MANUFACTURING TOLERANCES.
(8) IF RISER PIPE IS NOT SAME SIZE AS THE DISCHARGE ELBOW, AN ECCENTRIC INCREASER MUST BE USED LIMITED TO TWO SIZES LARGER MAXIMUM.

UL LISTED
ISO-9001 CERTIFIED
CSA CERTIFIED (THRU 365 FRAME)

CUSTOMER: FLO-SYSTEMS INC.					P.O. NO.: 7092-5R328	
JOB NAME: CITY OF ARVIN					TAG NAME:	
PUMP SIZE AND MODEL: 4" D5433MV		GPM: 270	TDH: 49	RPM: 1155	ROTATION: CLOCKWISE	
MOTOR: FAIRBANKS	HP: 10	FRAME: 210T	PHASE: 3	HERTZ: 60	VOLTS: 460	ENCLOSURE: SUBM.
CERTIFIED FOR: 088887			CERTIFIED BY: H.LAWTON		DATE: 08/19/05	

Fairbanks Morse
PENTAIR PUMP GROUP

BASIC PUMP
D5432MV AND D5433MV
PULL-UP SUBMERSIBLE
FAIRBANKS MORSE MTR

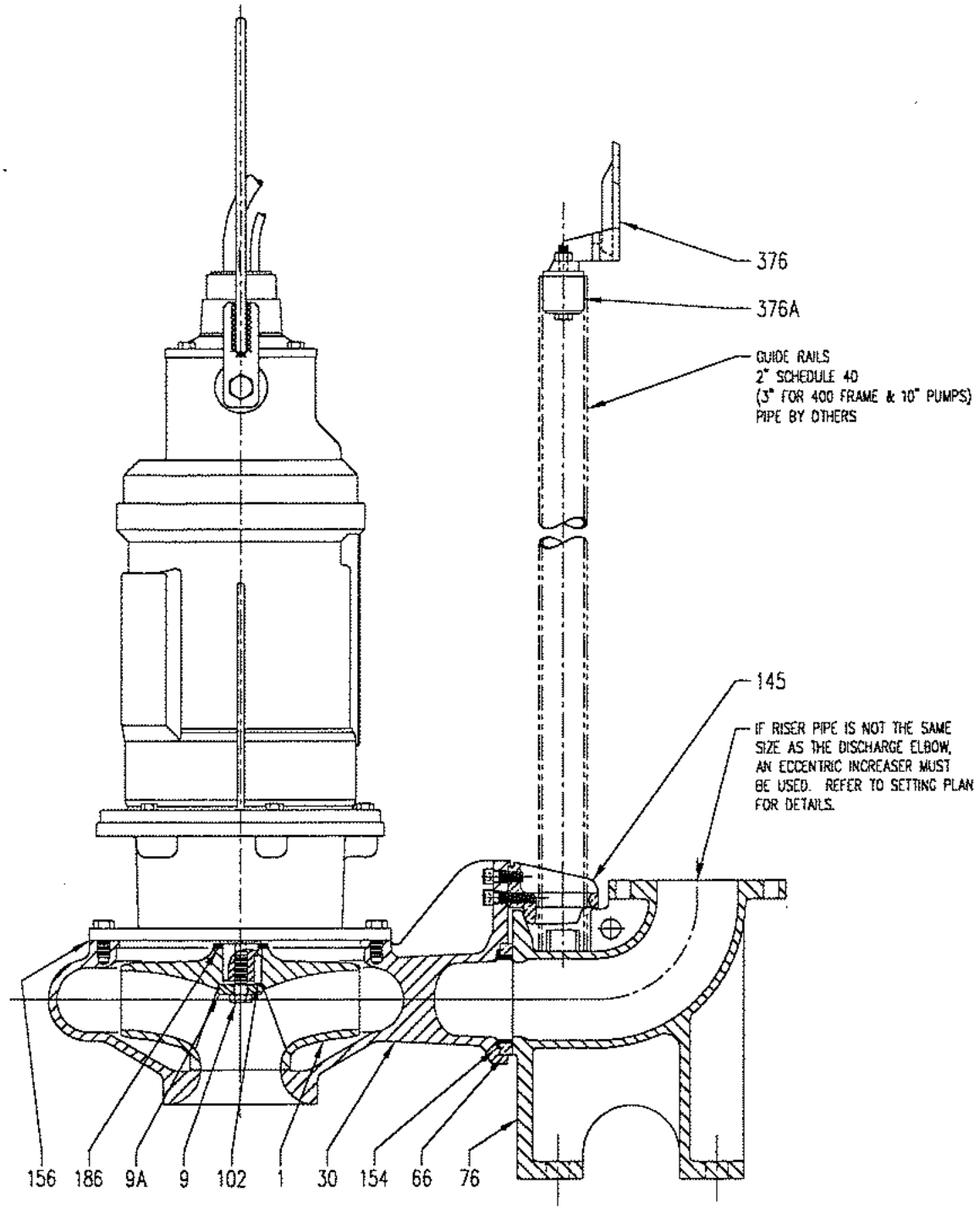
DWG NO: 088887SP
REV NO:

Fairbanks Morse Pump

Material Specifications

Item	Description	Material	Specification
1	Impeller	Cast Iron	A48 Class 30
9	Capscrew, Impeller	Steel	SAE Bolt Steel
9A	Washer, Impeller	Steel	AISI 1215
30	Volute	Cast Iron	A48 Class 30
66	Ring, Flange	Brass	B505 AL932
76	Discharge Elbow	Cast Iron	A48 Class 30
102	Key, Impeller	Steel	AISI-1018
145	Bracket, Guide	Brass	B584 AL836
154	Seal, Flange	Rubber	BUNA-N
156	Gasket, Volute	Tag Board	F104
186	Impeller Shim	Stainless Steel	A582-303
376	Upper Guide Bracket	Stainless Steel	A743 GR CF-8M
376A	Bushing, Upper Guide	Rubber	Commercial
	Bolting	Stainless Steel	Commercial

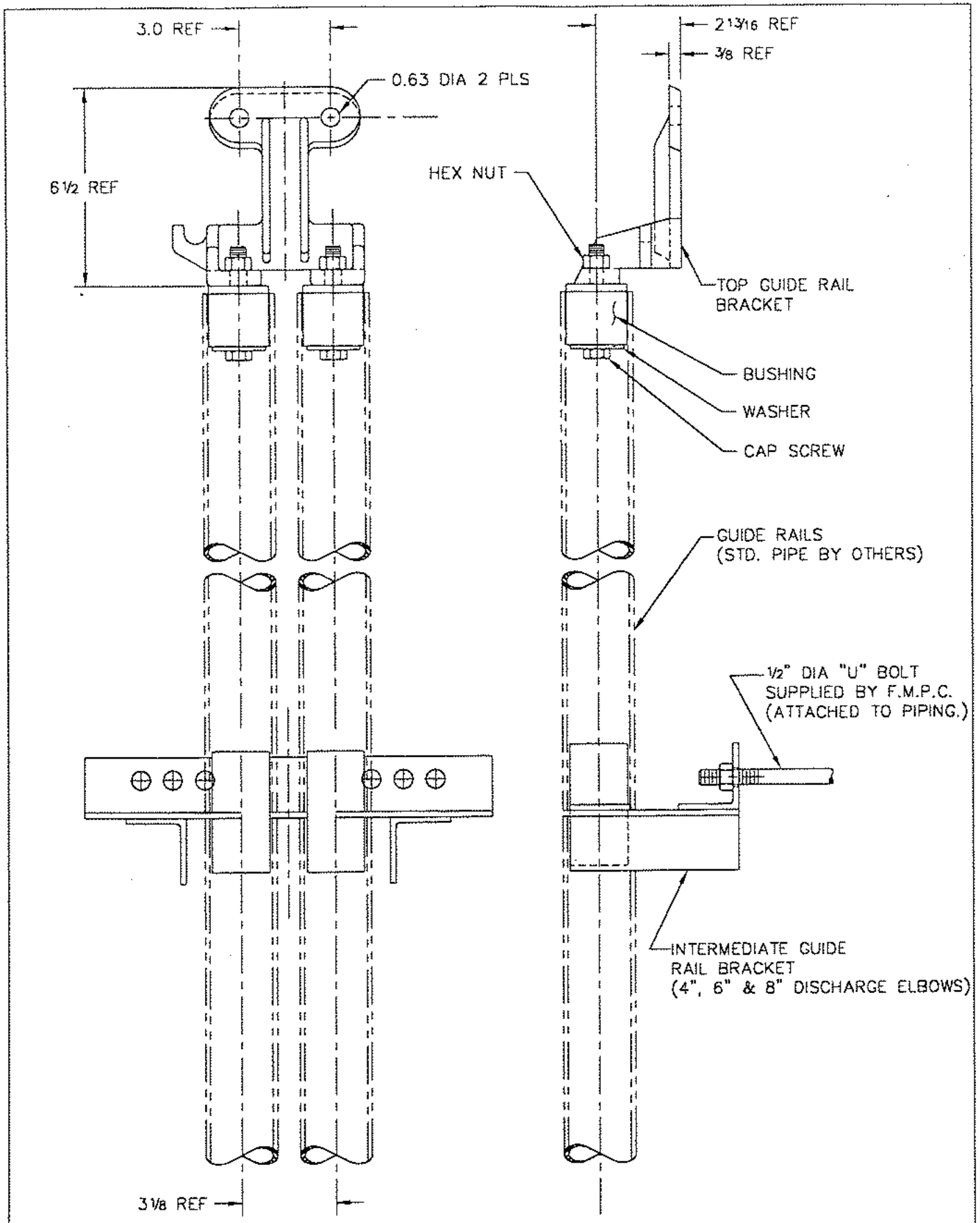
Notes:
1. All material specifications are ASTM unless otherwise noted and are or description of chemistry only.



ASSEMBLY, D5430MV, PULL-UP SUBMERSIBLE
THRU 365 FRAME FAIRBANKS MORSE MOTOR

Fairbanks Morse
PENTAIR PUMP GROUP

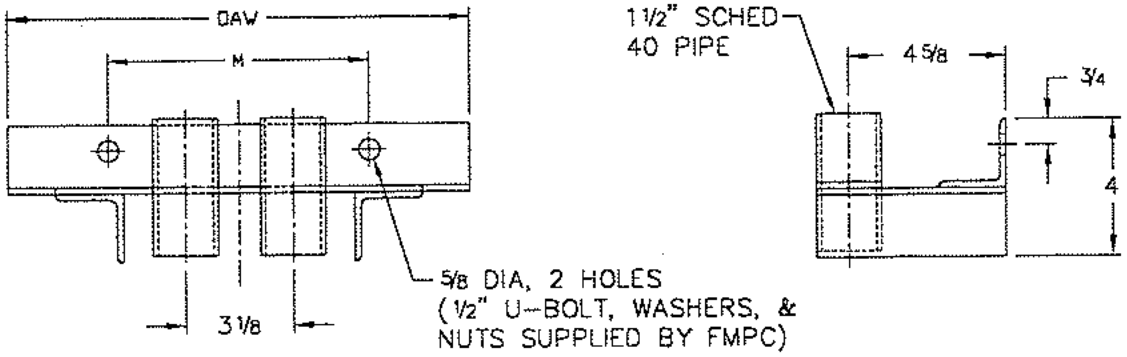
DWG NO 543MA005 REV NO 3



ASSEMBLY, TOP AND INTERMEDIATE GUIDE BRACKET
4", 6", 8" 543XMV PULL UP

Fairbanks Morse
PENTAIR PUMP GROUP

DWG NO IGB-468 REV NO 0



PUMP SIZE	DISCHARGE PIPE SIZE	OAW	M
2", 3", & 4"	4"	13 1/2"	5 1/2"
2", 3", 4", 5", & 6"	6"	13 1/2"	7 5/8"
3", 4", 5", 6", & 8"	8"	13 1/2"	9 3/4"
6", 8", & 10"	10"	16 1/4"	11 3/4"
8", 10" & 12"	12"	16 1/4"	14"

SUBMERSIBLE PULL-UP INTERMEDIATE GUIDE BRACKET DETAILS, CENTERLINE VOLUTE PUMPS

Fairbanks Morse
PENTAIR PUMP GROUP

DWG NO IGB-54MV REV NO 0

Size	4
Nominal Wear Ring Clearance	0.020
Impeller Fastener	
Tightening Torque (Lb.-Ft)	60
Impeller	
Weight (Lbs)	65.9
Inlet Area (In-Sq.)	37.5
WR^2 ($Lb\text{-}Ft^2$)	8.5
Sphere Size	3
Max. Hydrostatic Test (PSI)	125
Max. Casing Working (PSI)	85
Nominal Casing Thickness	1/2
Max. Operation Temp.	150^0f
Weight (Lbs.)	
Pump & Motor	640
Elbow	80

Fairbanks Morse Pump
Paint Specifications

- Coating Manufacturer:
  Kop-Coat
- Surface Preparation
  Standard
- Finish Coat
  Bitumastic 300M Epoxy
- Number of Coats:
  1
- Dry Film Thickness:
  8 Mils.
- Color:
  Black
- Surfaces to be coated:
  Exterior of Pump, Motor & Elbow

MODEL: 10

FRAME	HP	TYPE	PHASE/ HERTZ	RPM	VOLTS	AMPS*
210T	10.0	LK	3/60	1155	230/460	34.0/17.0

DUTY	AMB °C	INSUL.	S.F.	NEMA DESIGN	CODE LETTER
SHORT TIME DUTY IN AIR - ONE HOUR	40°	F	1.15	B	G

STATOR	ROTOR	TEST S.O.	TEST DATE	STATOR RES. @ 25 °C OHMS (BETWEEN LINES)
397633	395466-170	-------	11/30/90	1.168

PERFORMANCE **

LOAD	HP	AMPERES	RPM	% POWER FACTOR	% EFFICIENCY
2/4	5.0	11.7	1180	54.2	73.7
3/4	7.5	14.0	1165	64.9	77.0
4/4	10.0	17.2	1155	70.8	77.0
SERVICE FACTOR	11.5	19.4	1145	72.9	76.2

* MAXIMUM EXPECTED VALUE (NAMEPLATE AMPS.).
** INFORMATION BASED ON TYPICAL 460 VOLT POWER.

DWN. BY S.C.C.	CKD. BY J.D.C.	APP. BY J.H.S.	DATE 3/16/92	REL. NO. ER1-16112
DATA SHEET NUMBER: GMD21UC05				ISSUE DATE 3/16/92

Fairbanks Morse
Pump Corporation

SUBMERSIBLE MOTOR
GUARANTEED
PERFORMANCE DATA
UL LISTED

Short Time Duty in Air

		460/575V	
HP	RPM	Size	Diameter
10	1155	#10	0.735

Control Cable

1. Control Cable is 0.482 diameter and contains 5, #18 wires; 2 for thermostats, 2 for moisture detectors and 1 ground.

SINGLE MANUFACTURER

Motor and pump end are manufactured by Fairbanks Morse in our dedicated pump manufacturing facilities insuring compatibility, quality assurance, and reliability of the complete unit promoting long unit life.

Heavy cast iron motor housing, silicon laminations, centrifugally cast rotor matched to the stator for high efficiency. Constructed with Class "F" insulation and rated with a 1.15 service factor and continuous duty at 40 degree C ambient temperatures. Oil filled.

SHAFT

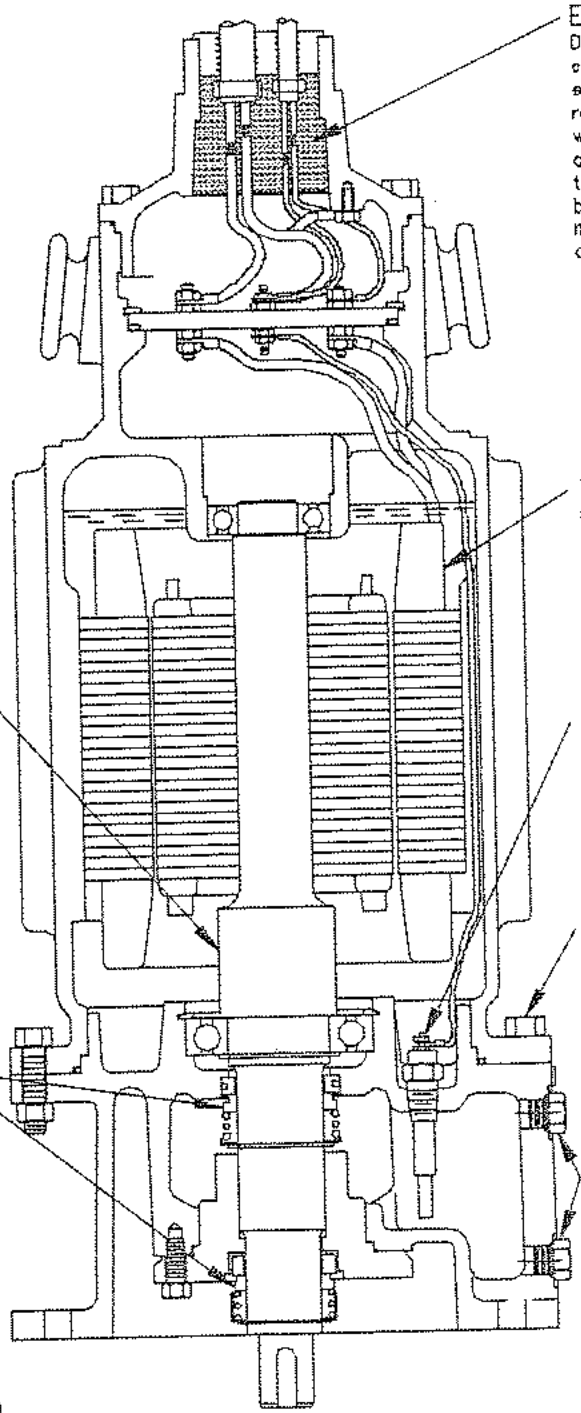
High quality one-piece 416 stainless steel, machined over its entire length to insure a tight fit of the impeller and rotor to the shaft.

MECHANICAL SEALS

Two seperate seals, tandem mounted to protect the motor from the liquid being pumped. Upper seal uses carbon against Ni-resist faces and the lower seal uses carbon against ceramic faces as standard. The lower seal also incorporates a protective cup to prevent trash or stringy material from interfering with the mechanical seal. Optional silicon carbide and tungsten carbide seal faces are also available. These seals provide added assurance of product reliability.

IMPELLER

Available in either enclosed radial flow, solids-handling two-vane, or bladeless design, having blunt well-rounded leading edges and thick hydrofoil shape. In order to pass large solids and stringy material, these one-piece cast impellers are designed for circular flow and matched specifically to the equalizing-pressure, constant-velocity volute. (Optional stainless steel impeller wear ring.)



ELECTRICAL CONNECTION

Double-seal system with strain relief, consisting of rubber grommet followed by epoxy. Individual wires have insulation removed and epoxy potted to prevent wicking into the motor area. Wires are terminated with connectors secured to bronze lugs on the O-ring sealed terminal board. Stator and control leads from the motor are attached to the under side of these lugs.

THERMOSTATS

Imbedded in the motor windings to protect from over-heating. These devices are reset automatically. Excessive heat will cause the normally closed contact to open, stopping the motor.

TWO MOISTURE DETECTORS

Standard on all units to detect moisture entering the oil cavity and send a signal to a compatible controller.

STAINLESS STEEL BOLTING

External bolting is stainless steel as standard for ease of maintenance.

OIL INSPECTION PLUGS

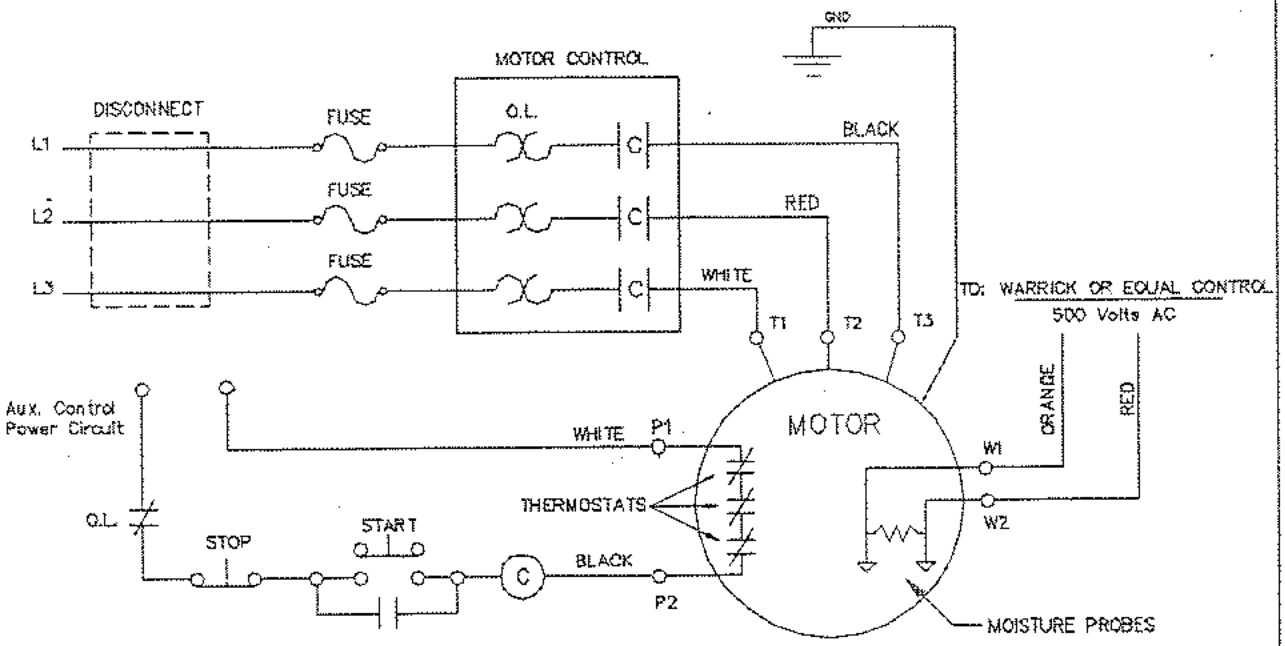
Convenient, easily removable O-ring sealed plugs for inspection and ease of changing oil in the mechanical seal chamber.

- ☐ UL Approved
- ☐ CSA Approved
- ☐ Non-UL

210 & 220 FRAME
SUBMERSIBLE MOTOR

Fairbanks Morse Pump Corporation

DWG NO DSUBM011 REV NO 2



210, 220, 250 & 320 FRAMES

543MM001.DWG

The current through the thermostats shall not exceed the limits shown below:

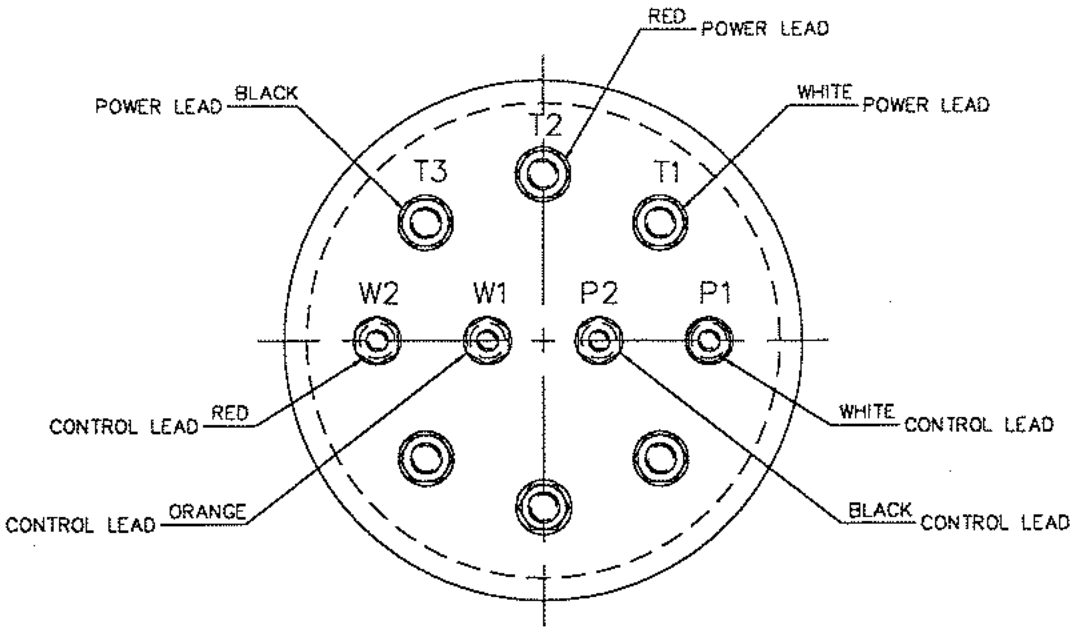
ALTERNATING CURRENT		
VOLTS	CONTINUOUS AMPERES	IN RUSH AMPERES
110–120	3.0	30.0
220–240	1.5	15.0
460–480	0.75	7.5
550–600	0.60	6.0

CABLE CONNECTION LEAD COLOR CODE					
DEVICE	BLACK	WHITE	RED	ORANGE	GREEN
POWER CABLE	T3	T1	T2	N/A	GROUND
THERMOSTATS	P2	P1	N/A	N/A	GROUND
MOISTURE DETECTOR	N/A	N/A	W2	W1	GROUND

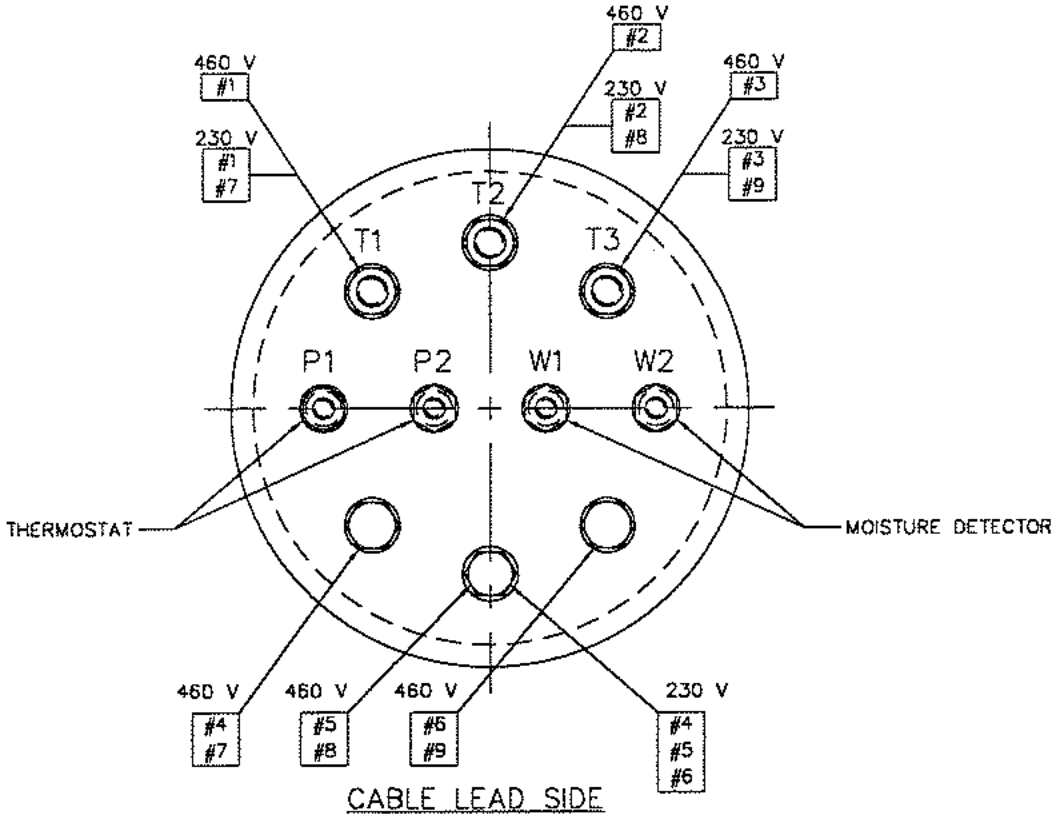
FAIRBANKS MORSE PUMP CORPORATION
SUBMERSIBLE MOTOR WIRING DIAGRAM
210T, 220T, 250T & 320T FRAME MOTORS

Fairbanks Morse

DWG NO 543MM001-1 REV IND



MOTOR LEAD SIDE
CONNECTIONS
FIGURE #7



CABLE LEAD SIDE
CONNECTIONS
FIGURE #8

FAIRBANKS MORSE PUMP CORPORATION
TERMINAL BOARD CONNECTIONS, 3HP – 40HP,
210T – 320T FRAME DUAL VOLTAGE MOTORS

Fairbanks Morse
PENTAIR PUMP GROUP

DWG NO 543MM015-3 REV NO 0

RECORD SUBMITTAL

PUMP CONTROL PANEL
SOUTH A STREET LIFT STATION
ARVIN, CA

US FILTER CONTROL SYSTEMS
PROJECT NUMBER - 504216
CUSTOMER PURCHASE ORDER NUMBER - 7090-5R328

AUGUST 26, 2005

SUBMITTED BY:

US FILTER CONTROL SYSTEMS
1239 WILLOW LAKE BOULEVARD
VADNAIS HEIGHTS, MINNESOTA 55110
(651) 766-2700
JEFF TERRIO - PROJECT ENGINEER
WENDY HANSEN - PROJECT ADMINISTRATOR

SUBMITTED TO:

FLO-SYSTEMS INC.
3010 FLOYD STREET
BURBANK, CA 91504-2599

ATTN: RICK JESMOK

A Siemens Business

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Panel Bill of Materials	504216 - 7040-7060	09/08/05
Product Literature		
Bussman Power Distribution & Terminal Blocks	2356	
Bussmann FNQ-R Time Delay Fuses	2349	
Corcom R Series Two Stage RFI Line Filter	1069	
Crouzet ENR Level Control	601	
Chromalox SL-A Flexible Heater	296	
Diversified Electronics Latching Temperature Switch Relay	1063	
Edwards AdaptaBeacon 104ST Series Strobe Flashing Lights	2158	
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Hubbell GFCI Duplex 120V 20A Receptacle	585	
Idec RR Series General Purpose Relays	1184	
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Paktron Arc Suppressor Snubber Q/QRL Quencharc	1563	
Phoenix Contact PLC-RSC-12VDC Relay Spec.	803	
Phoenix Contact UK 5N Terminal Block	1579	
Products Unlimited Transformer	1270	
Phoenix Contact 120V 15A Receptacle	623	
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Square D 9001 30mm Push Buttons	971	
Square D Circuit Breaker Door Operating Mechanisms Class 9421	631	
SquareD Type 9421 Door Handle	1600	
Square D FAL and FCL Thermal Magnetic Class 650 Circuit Breaker	1945	
Square D QO Load Centers Accessories Class 1130	637	
Square D QO and QB Circuit Breaker w VISI_TRIP Class 730,731 733	605	
USFilter A1000 Submersible Level Transducer	1980	
USFilter CB1T Controller	1984	
USFilter Breather Bag Assembly Diagram	2398	
USFilter A1000i Submersible Level Transmitter	2355	
Usfilter A1000i Looped Power / 4-20mA Submersible Level Transmitter/Transducer	558	
USFilter IS2-2 Intrinsically Safe Barrier	2210	
USFilter IS6 Intrinsic Safety Barrier	2000	
USFilter 9G-EF Mercury Free Directing Acting Float Switch	2259	
USFilter 9G 9G-EF Float Switch, B100 Floats	1304	
USFilter CMR25 Transducer Isolation Amplifier.	621	
USFilter "View-At-A Glance" D150 Series Controllers	1997	
USFilter Suspension Cable Assembly Instructions	552	
System Drawings		
Electrical Legend	STD-000-E01-001-00	A
Nameplate Detail	STD-000-E06-001-00	A
Pump Control Panel	504216-001	A

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Important Information Required – A504216CI Rev. A

This submittal package requires information that is necessary to complete the design and /or calibrate the equipment. **We will be unable to establish a shipment date until we receive the requested information.**

The wetwell level range is: 0-10.0 FT (please confirm)

We have submitted on the following emergency receptacle:

Crouse Hinds AR1041-S22

Please confirm this receptacle will work with the existing generator plug.

Jeff Terrio
Project Engineer

USFilter

Important Information

The information and designs contained in this submittal are derived from the contract drawings, specifications (the sections that have been provided to US Filter Control Systems (USFCS)), USFCS quotation, letters, phone conversations, site meetings, and other means of communications. USFCS has made a good faith effort in consolidating all this information into this submittal. Please review this submittal carefully and respond with any questions or comments that arise. If no comments or questions are received, USFCS will supply the system as represented in this submittal. Any change(s) to USFCS's scope of supply after receipt of the approved submittal documentation will be subject to an additional charge.

Jeff Terrio
Project Engineer

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A Siemens Business

Project Summary and Functional Description

S.O.504216 - ARVIN, CA

REVISION	1.0	1.1	1.2	1.3	1.4
DATE	9/7/05				
PURPOSE	Issued For Construction				
ISSUED BY	JT				
CHECKED BY	JT				
CLIENT APPROVAL					

Section 1.1 Project Summary

Unit A – Pump Station Powerpack Control Panel

Model A1000i/B100/B300/D153U/F100/G504 triplex constant speed pump controller supplied in NEMA 3R freestanding enclosure. This equipment will operate on 480 volt, 3 phase, 3 wire, 60 hertz service. Unit will monitor wet well level via new remote mounted submersible level transducer (primary) and new float switch (Back up) system and provide triplex constant speed based pump down control for 10 HP motors. Unit shall include operation of 1.5 HP ventilation system via time clock or interlocked with hatch door (door switch By Others). Unit shall include alarm dialer (4 Circuit) for offsite notification of alarms. Unit shall detect seal fail, Overtemp and provide local indication. Unit shall protect motors from power disturbances via internally mounted power monitor.

TO INCLUDE:

Qnty	Description
1	Enclosure 60" x60" x18" NEMA 3R Freestanding w/Inner Door and Chassis
2	Circuit Breaker 100 Amp Trip, 3 Pole, 14 KAIC w/Door Operating Handle – Main & Emergency
1	Mechanical Interlock For Main & Emergency Power Circuit Breakers
1	Three Phase Lightning Arrestor
1	Generator Receptacle 100 Amp. CH Model AR1041-S22 4 Wire 4pole - STYLE 1
1	Circuit Breaker 25 Amp Trip, 2-Pole, 14KAIC – Lighting Transformer
1	Transformer 480/120 VAC @ 5 KVA
1	Lighting Panel, 12 Circuit w/Main & 6 Branch Ckt Breakers
1	Power Monitor -Motor Saver, 3 Phase Voltage Monitor w/Fuse Protection
3	Circuit Breaker 30 Amp Trip, 3-Pole, 14KAIC, Motor 1, 2, & 3
1	Circuit Breaker 15 Amp Trip, 3-Pole, 14KAIC, Ventilation Motor
2	Motor Starter FVNR NEMA Size 1 w/Adjustable Overload, Auxiliary Contacts & Reset PB – Motor 1 & 2
1	Space For Third Motor Starter – For Future Pump
1	Motor Starter FVNR NEMA Size 0 w/Adjustable Overload, Auxiliary Contacts & Reset PB Ventilation Fan
3	Running Time Meter – Motor 1, 2, & 3
9	Indicator Light FV PTT - 3 Run, 3 Seal Fail, 3 Overtemp
4	Selector Switch, 3 Position, Hand-Off-Auto – Motor 1, 2, & 3, Ventilation Fan
11	Relay GP
3	Seal Leak Sensor
3	Overtemp Relay
2	Time Delay Relay – Back Up System Motor Start Stagger Delay
1	Heater 50W w/100F Thermostat – Condensation
1	Time Clock Tork Model 8007L 7 day, 96 Pin – Ventilation Time Control System
1	D153U Controller w/0-10 Ft Range, Alternator, High & Low Alarms – Primary
1	Model CMR25 Analog Input Isolator w/Loop Power Supply – Wet Well Level
1	Model IS1-2i Intrinsic Safety Barrier – Submersible Level Transducer
1	Model IS6 Intrinsically Safety Barrier – Float Switch
1	CB1T Single Stage Controller w/High Level Alarm – Back Up
1	Alarm Strobe Light, Red Globe – Top Mounted
1	CA Code Labels, Barriers, UL 698A
1	Auto dialer 4 Channel – Sensaphone Express
1	Breather Bag

Shipped Loose For Field Mounting

1 Model A1000i Loop Powered Submersible Level Transducer w/60 Ft. Cable
1 Model A1000 Cable Suspension Kit w/21 Ft. 316 SS Cable
2 Model 9G-EF Float Switch w/60 Ft. Cable

Section 1.2 Project Functional Description

Unit will monitor wet well level via new remote mounted submersible level transducer (primary) and new float switch (Back up) system and provide triplex constant speed based pump down control for 10 HP motors. Unit shall include operation of 1.5 HP ventilation system via time clock or interlocked with hatch door (door switch By Others). Unit shall include alarm dialer (4 Circuit) for offsite notification of alarms. Unit shall detect seal fail, Overtemp and provide local indication. Unit shall protect motors from power disturbances via internally mounted power monitor.

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O&M Bill Of Material

Project Name: ARVIN CA SO A STREET LS

Project Number: 504216

Task 7040

Task Name: Separate Parts

Print Date: 9/8/2005

Quantity	Manufacturer Name	Manufacturer Part Number	Range	Tag
1	USFCS A1000 HOUSING/CABLE SUB ASSY 60FT	6012640006		
1	USFCS A1000 i SENSOR 5 PSI 4-20mA OUTPUT (11.5 FT. OF WATER)	6012950012		
2	USFCS Float Sw., 9G-EF NO Teflon coated, 316 SS, 60' cable	6013520060		
1	USFCS 157 GSC LWR UNIT CABLE SUSP PIPE	6014180001		
1	USFCS A1000 316SS Clamps and Cable Suspension Kit 21 FT	6014400020		

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O&M Bill Of Material

Project Name: ARVIN CA SO A STREET LS

Project Number: 504216

Task 7060

Task Name: Control Panel

Print Date: 9/8/2005

Quantity	Manufacturer Name	Manufacturer Part Number	Range	Tag
17	PAKTRON RC SNUBBER, Q-ARC, .1uF +-20%, 125VAC, 150 OHM,UL	104MACQRL150		
1	EDWARDS SIGNAL Alarm Stobe Red Nema 4X 120V N4X Panel / Pipe Mout	104STR-N5		
1	BUSSMANN POWER DISTRIBUTION BLOCK, 3 POLE, 2-#14-2/0 & 6-#14-#4	16325-3		
1	CORCOM FILTER AC LINE 1A/250V, 81F4553	1VR1		
3	PHOENIX CONTACT RELAY, SPDT, 12VDC, 6A, PLC-RSC-12DC/21 2966896 + 2961150	2966906		
60	PHOENIX CONTACT TB, UL, 600V, 30A, 10-30AWG, GRY, 6.2MM, UK5N	3004362		
1	LEHMAN ENCLOSURE, 3R, 3PT LATCH, GRAY, 60x60x18	3R2F3GVG606018XXXU		
1	PRODUCTS UNLIMITED XFR 120/12V 30VA CL2 4000-20T14J507 / TYCO 3-1611511-3	4000-20T14J507		
3	SYMCOM Phase Loss Monitor, 190-480VAC, 3 Phase, SPDT,DIN Rail Mount	460		
1	PHOENIX CONTACT RECEPTACLE, SINGLE, 15AMP, DIN MTG	5604253		
1	SQUARE-D XFMR, CONTROL 5KVA, 480/240-240/120 NEMA 3R, 115 PDS	5S1F		
1	USFCS CB1T SINGLE PUMP/REDUNDANT CTL	6012800001		
1	USFCS BRTHR BAG ASSY KIT(D15X&A1000)	6012880001		
1	USFCS IS2-2 INTRINSIC SAFETY BARRIER 4-20, A1000I COMPATIBLE	6013150006		
1	USFCS IS6 INTRINSICALLY SAFE MODULE- U.L.	6013160002		

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O&M Bill Of Material

Project Name: ARVIN CA SO A STREET LS

Project Number: 504216

Task 7060

Task Name: Control Panel

Print Date: 9/8/2005

Quantity	Manufacturer Name	Manufacturer Part Number	Range	Tag
1	USFCS CMR25 XDCR ISOLATION AMP 24V OUTPUT	6013920004		
1	USFCS D153U BAR GRAPH CONTROLLER 10FT	6013940010		
3	REDINGTON RUN, TIME, METERS, 120V, HOURS, 1.89" SQUARE	711-0180		
1	MOTOROLA DIODE, 1A, 600V MOTOROLA #1N4005	8001980001		
1	TORK 24 HOUR TIMER	8007L		
3	CROUZET RELAY, SEAL FAIL, ENR, PUMP DOWN, 120V	84870203		
1	SQUARE-D MS, SZ 0, NEMA, 3P, FLA 1.5-4.5 CLASS 30, 120V COIL	8536SBO2V02H308S		
2	SQUARE-D MS, SZ 1, NEMA, 3P, FLA 9-27, CLASS 30, 120V COIL	8536SCO3V02H30S		
4	SQUARE-D PUSHBUTTON, 1NO/1NC, MOMENTARY, BLK, FULL	9001SKR1BH13		
4	SQUARE-D SELECTOR SWITCH,3POS,NON-ILLUM,BLACK,1NO/NC,(KA1)SIDE#2	9001SKS46BH13		
3	SQUARE-D PILOT LIGHT, PTT, 120VAC/DC FV, GRN CAP, 30mm, NEMA 4X	9001-SKT38G31		
6	SQUARE-D PILOT LIGHT,PTT,120VAC/DC, FV, RED CAP, 30mm, NEMA 4X	9001-SKT38R31		
2	SQUARE-D OPERATING HANDLE KIT, 3" HANDLE,OPERATING MECH & SHAFT	9421LN3		
3	SQUARE-D AUX. CONTACT BLOCK FOR SOLID STATE O.L.	9999AC04		
3	SQUARE-D MS, REMOTE RESET, 120VAC	9999RR04		

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O&M Bill Of Material

Project Name: ARVIN CA SO A STREET LS

Project Number: 504216

Task 7060

Task Name: Control Panel

Print Date: 9/8/2005

Quantity	Manufacturer Name	Manufacturer Part Number	Range	Tag
1	CROUSE HINDS ADAPTER, ANGLE, 60/100A, CROUSE HINDS	AJA6		
1	CROUSE HINDS Emergency Receptacle 100 Amp 3 Wire 4	AR1042-S22		
1	BUSSMANN COVER, POWER DIST BLOCK, 3 POLE FOR 163 SERIES	CPDB-3		
1	SQUARE-D CIRCUIT BREAKER, 480V, 25A, MOLDED CASE	FAL24025		
1	SQUARE-D CB, 480V.,15 AMP, 3 POLE, SQD FAL34015	FAL34015		
3	SQUARE-D MOLDED CASE CIRCUIT BREAKER 480V 30A 3P	FAL34030		
2	SQUARE-D MOLDED CASE CIRCUIT BREAKER 480V 100A 3P	FAL34100		
1	SENSAPHONE DIALER, EXPRESS , 4CHANNEL	FGD-6500		
3	BUSSMANN FUSE, 1 AMP, Slow Blo Rej.Type, Class CC, 600V, 200KAIC	FNQ-R-1		
1	HUBBELL GFCI, 20A, 120V, DUPLEX, IVORY, #1446787	GFR5352IA		
1	SQUARE-D LP, Ground Bar, 12-Circuit 250A Max	PK9GTA		
1	SQUARE-D CIRCUIT BREAKER, 1P, 10A, 120V	QO110		
1	SQUARE-D LIGHTING PANEL, 12 SPACE, PANEL ONLY	QO112M100		
5	SQUARE-D CIRCUIT BREAKER 20AMP 1P, 120V.	QO120		
1	SQUARE-D COVER & DOOR FOR QO112M100	QOC12US		

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O&M Bill Of Material

Project Name: ARVIN CA SO A STREET LS

Project Number: 504216

Task 7060

Task Name: Control Panel

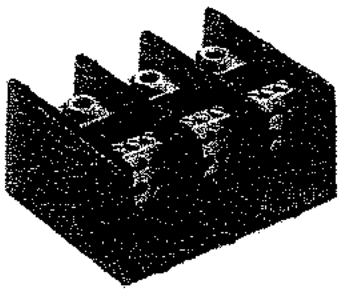
Print Date: 9/8/2005

Quantity	Manufacturer Name	Manufacturer Part Number	Range	Tag
1	SQUARE-D CB, 50A, 2P, LIGHTING PANEL MAIN	QOM50VH		
14	IDEC Relay 3PDT 120VAC, IND LIGHT	RR3B-UL AC120V		
1	IDEC Relay, 3PDT, 12VDC, Ind Light	RR3B-UL-DC12V		
2	IDEC TIMER, POWER-TRIGGERED, ON-DELAY, 0.1S-600H, 12VDC	RTE-B1D12		
1	SQUARE-D Surge Arrestor Class 6671 650 Vac Phase to Ground Maximum	SDSA3650		
1	CHROMALOX 100W, 4x5, 36" LEADS, 120V, w/PSAS & 85-100F T-STAT	SLA-4-5-85/100P-36-120V-100W		
3	DIVERSIFIED ELECTRONICS Relay Motor Temp Alarm	SPM-120-ADA		
17	IDEC Socket, 11 Blade, Snap-Mount/Surface Mount	SR3B-05		
3	IDEC Socket, 11-pin Octal, Snap-Mount/Surface Mount, Raised	SR3P-05		
3	GOULD SHAWMUT Fuse Holder, "Ultrasafe", 1 Pole w/indicator for Class CC	USCCH		

Power Distribution & Terminal Blocks

PDB

Power Distribution Blocks
600 Volt AC or DC



Catalog Symbol: Power Distribution Blocks
Voltage Rating: 600 Volts AC or DC maximum
Agency Information:
UL Recognized, Guide XCFR2, File E84923
CSA Certified, Class 6228-01, File 15364

Example: A 3-pole, 16023 series is 16023-3. It has 1 line opening per section that accepts 350MCM - #6. 3 openings total. This block has 6 load openings per section. Each opening accepts #6 - #14 wire. A total of 18 openings are on the 3-pole block.
Picture shown:
3-Pole - 1 opening on line per pole
6 opening on load per pole

Power Distribution Blocks (600V) Catalog Data

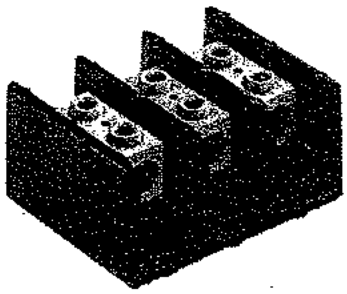
Catalog Number	1-Pole	2-Pole	3-Pole	4-Pole	Connection Line	Connection Load	Connector Material and Ampacity	UL	CSA
16021	NA	-2	-3	-4	2/0 - #14CU, 2/0 - #8AL	(6) #4 - #14CU, #4 - #8AL	AL-175A	•	•
16023	NA	-2	-3	-4	350kcmil - #6CU-AL	(6) #4 - #14CU, #4 - #12AL	AL-310A	•	•
16220	-1	-2	-3	NA	2/0 - #14CU, 2/0 - #8AL	(4) #4 - #14CU, #4 - #8AL	AL-175A	•	•
16321	-1	-2	-3	NA	2/0 - #14CU, 2/0 - #8AL	(6) #4 - #14CU, #4 - #8AL	AL-175A	•	•
16323	-1	-2	-3	NA	350kcmil - #6CU-AL	(6) #4 - #14CU, #4 - #12AL	AL-310A	•	•
16325	-1	-2	-3	NA	(2) 2/0 - #14CU, 2/0 - #8AL	(6) #4 - #14CU, #4 - #8AL	AL-350A	•	•
16330	-1	-2	-3	NA	500kcmil - #6CU-AL	(6) #2 - #14CU, #2 - #12AL	AL-380A	•	•
16332	-1	2	-3	NA	350kcmil - #6CU-AL	(3) #2 - #14CU, #2 - #8AL (2) 1/0 - #14CU, 1/0 - #8AL	AL-310A	•	•
16335	-1	-2	-3	NA	500kcmil - #6CU-AL	(3) #2 - #14 CU, #2 - #8AL (2) 1/0 - #14CU, 1/0 - #8AL	AL-380A	• •	• —
16370	-1	2	-3	NA	350kcmil - #6CU-AL	(12) #4 - #14CU, #4 - #12AL	AL-310A	•	•
16371	-1	-2	-3	NA	350kcmil - #6CU-AL	(6) #2 - #14CU, #2 - #8AL (3) 1/0 - #14CU, 1/0 - #8AL	AL-310A	•	•
16372	-1	-2	-3	NA	350kcmil - #6CU-AL	(21) #10 - #14CU, #10AL	AL-310A	•	•
16373	-1	-2	-3	NA	350kcmil - #6CU-AL	(3) 1/0 - #14CU-AL (14) #10 - #14CU, #10AL	AL-310A	•	•
16375	-1	-2	-3	NA	600kcmil - #2CU-AL	(12) #4 - #14CU, #4 - #12AL	AL-420A	•	•
16376	1	-2	-3	NA	600kcmil - #2CU-AL	(6) #2 - #14CU, #2 - 8AL (3) 1/0 - #14CU, 1/0 - #8AL	AL-420A	•	•
16377	1	-2	-3	NA	(2)300kcmil - #4CU-AL	(12) #4 - #14CU, #4 #12AL	AL-570A	•	—
16528	-1	-2	-3	NA	(2) 600kcmil - #2CU-AL	(4) 3/0 - #6CU-AL (4) #4 - #14CU-AL	AL-840A	•	—
16530	-1	-2	-3	NA	(2) 500kcmil - #6CU-AL	(12) #4 - #14CU-AL	AL-760A	•	•
16541	-1	-2	-3	NA	500kcmil - #6CU-AL	(21) #6 - #14CU-AL	AL-380A	•	—

How To Order: Catalog Number + # of Poles
Example: 16021-3 (complete part number)

Power Distribution & Terminal Blocks

PDB

Splicer Terminal Blocks
600 Volt AC or DC



Catalog Symbol: Splicer Terminal Blocks
Voltage Rating: 600 Volts AC or DC maximum
Agency Information:
UL Recognized, Guide XCFR2, File E84923
CSA Certified, Class 6228-01, File 15364

Picture shown:
3-Pole - 1 opening on line per phase
1 opening on load per phase

Power Distribution Blocks (600V) Catalog Data

Catalog Number	1-Pole	2-Pole	3-Pole	4-Pole	Connection Line	Connection Load	Connector Material and Ampacity	U.R.	CSA
16000	NA	-2	-3	-4	2/0 - #8CU-AL	2/0 - #8CU-AL	AL-175A	•	—
16003	NA	-2	-3	-4	250kcmil - #6CU Only	250kcmil - #6CU Only	CU-255A	•	—
16005	NA	-2	-3	-4	350kcmil - #6CU-AL	350kcmil - #6CU-AL	AL-310A	•	—
16200	-1	-2	-3	NA	#2 - #14CU, #2 - #8AL	#2 - #14CU, #2 - #8AL	AL-115A	•	•
16201	-1	-2	-3	NA	1/0 - #14CU Only	1/0 - #14CU Only	CU-150A	•	•
16204	-1	-2	-3	NA	2/0 - #8CU-AL	2/0 - #8CU-AL	AL-175A	•	•
16301	-1	-2	-3	NA	250kcmil - #6CU Only	250kcmil - #6CU Only	CU-255A	•	•
16303	-1	-2	-3	NA	350kcmil - #6CU-AL	350kcmil - #6CU-AL	AL-310A	•	•
16500	-1	-2	-3	NA	(2) 350kcmil - #4CU-AL	(2) 350kcmil - #4CU-AL	AL-620A	•	•
16504	-1	-2	-3	NA	(2) 500kcmil - #6CU-AL	(2) 500kcmil - #6CU-AL	AL-760A	•	•

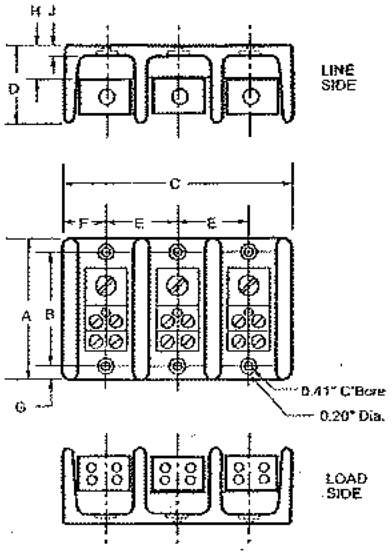
Power Distribution & Terminal Blocks

PDB

Connector-Stud and Stud-Stud Blocks
600 Volt AC or DC

Catalog Symbol: Connector-Stud Block
Voltage Rating: 600 Volts AC or DC maximum
Agency Information:
UL Recognized, Guide XCFR2, File E84923
CSA Certified, Class 6228-01, File 15364

Series 162, 163, 164, and 165 Dimensional Data (Available 1, 2, and 3 pole)



Dimensions for Series 162, 163, 164, and 165

Cat. No.	A	B	C1	C2	C3	D	E	F	G	H	J	K	L
162	2.88	2.25	1.06	1.88	2.69	1.75	0.81	0.53	0.31	0.84	0.31	0.20	0.41
163	4.0	3.38	1.98	3.60	5.21	3.32	1.62	0.97	0.31	0.87	0.36	0.20	0.41
165	5.5	4.75	3.12	5.87	8.5	3.13	2.69	1.56	0.38	1.36	0.63	0.20	0.41

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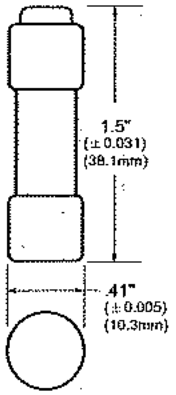
CC-TRON®

FNQ-R

Time-Delay Fuses

13/32" × 1½", 600 Volt, ¼ to 30 Amps

Dimensional Data



Catalog Symbol: FNQ-R
Time-Delay
Application: Circuit Transformer Protection
Ampere Rating: ¼ to 30 Amperes
Voltage Rating: 600 Volts AC (or less)†
Interrupting Rating: 200,000A RMS Sym. (U.L.)
Agency Approvals:
U.L. Listed, Std. 248-4, Class CC, Guide JDDZ, File E4273
CSA Certified, Class CC CSA, Class 1422-01,
File 53787-HRC-MISC

†12-30 amp is 300 Vdc and 10 KAIC.

Electrical Ratings (Catalog Symbol and Amperes)

FNQ-R-¼	FNQ-R-1 3/10	FNQ-R-3 9/10	FNQ-R-8
FNQ-R-3/10	FNQ-R-1 4/10	FNQ-R-3½	FNQ-R-9
FNQ-R-4/10	FNQ-R-1½	FNQ-R-4	FNQ-R-10
FNQ-R-½	FNQ-R-1 9/10	FNQ-R-4½	FNQ-R-12
FNQ-R-9/10	FNQ-R-1 15/10	FNQ-R-5	FNQ-R-15
FNQ-R-¾	FNQ-R-2	FNQ-R-5 9/10	FNQ-R-17½
FNQ-R-5/10	FNQ-R-2¼	FNQ-R-6	FNQ-R-20
FNQ-R-1	FNQ-R-2½	FNQ-R-6¼	FNQ-R-25
FNQ-R-1⅛	FNQ-R-2 9/10	FNQ-R-7	FNQ-R-30
FNQ-R-1¼	FNQ-R-3	FNQ-R-7½	---

Carton Quantity and Weight

Ampere Ratings	Carton Qty.	Weight* Lbs.	Weight* Kg.
¼-30	10	.200	.091

*Weight per carton

General Information:

- The Bussmann CC-TRON® (FNQ-R) was designed to meet the needs of control circuit transformer protection.
- Current-limitation protects down stream components against damaging thermal and magnetic effects of short-circuit currents.
- **Rejection feature.** FNQ-R fuses meet the U.L. 508, paragraph 19.2.4 requirement that control circuit fuses used in equipment listed for use with more than 10,000 ampere available must have an adequate interrupting rating and must be rejection type.
- **High inrush time-delay.** Control circuit transformers can experience inrush currents up to 85 times their full-load current rating. FNQ-R fuses can be sized according to NEC and U.L. requirements and still allow the high inrush currents, with significantly more time-delay than the U.L. minimum value of 12 seconds at 200% for Class CC fuses.
- Melamine tube. Nickel-plated brass endcaps.

Maximum Acceptable Rating of Overcurrent Device*

Rated Primary Current (Amperes)	Maximum Rating of Overcurrent Protective Device Expressed As A Percent of Transformer Primary Current Rating
Less than 2A	500**
2A to less than 9A	167
9A or more	125

*U.L. 508, Table 19.3.
**300% for other than motor control applications.

CE logo denotes compliance with European Union Low Voltage Directive (50-1000 Vac, 75-1500 Vdc). Refer to BIF document #8002 or contact Bussmann Application Engineering at 636-527-1270 for more information.

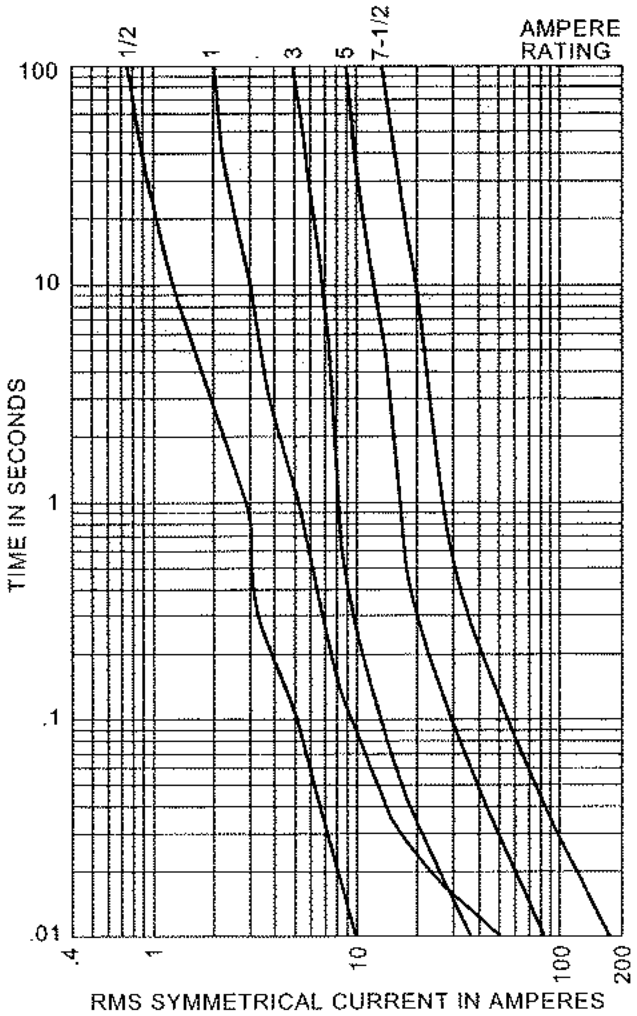
CC-TRON®

FNQ-R

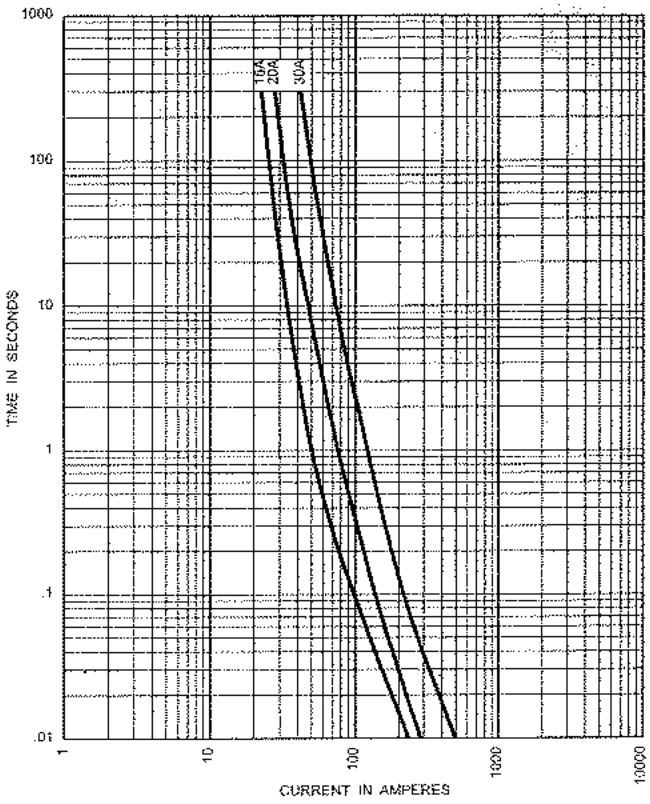
Time-Delay Fuses

13/32" x 1½", 600 Volt, ¼ to 30 Amps

Time-Current Characteristics–Total Clearing



Time-Current Characteristics–Average Melt



Fuseblock Catalog Numbers

No. of Poles	Screw Terminal	Pressure Plate	Box Terminal	Screw Quick-Connect	Pressure Quick-Connect
1	BC6031S	BC6031P	BC6031B	BC6031SQ	BC6031PQ
2	BC6032S	BC6032P	BC6032B	BC6032SQ	BC6032PQ
3	BC6033S	BC6033P	BC6033B	BC6033SQ	BC6033PQ

See Also OPTIMA - Overcurrent Protection Modules

Catalog Number		BIF Document No.
OPM-SW	Fuse Switch with indication	1101
OPM-CC	Fuse Module with indication	1100

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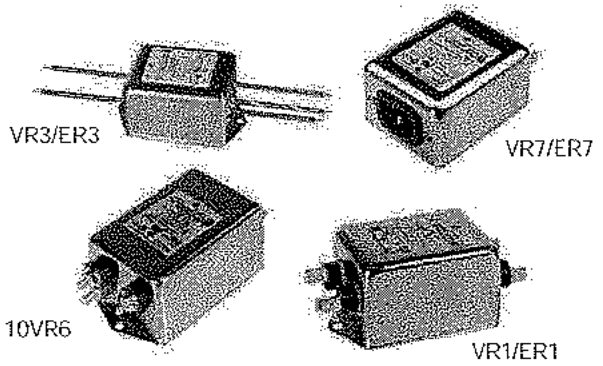
R Series

Two-Stage General Purpose RFI Power Line Filter

UL Recognized
CSA Certified
VDE Approved
SEV Approved*



R Series

Corcom's dual T section RFI power line filters provide premium performance at moderate cost. They are well suited for low impedance loads where noisy RFI environments are present. They control pulsed, continuous and/or intermittent interference, insuring protection of your equipment from power line noise in addition to protecting the line from equipment noise. The R series dual T type provides low leakage current without deterioration of insertion loss characteristics and at a competitive cost. The ER models meet the very low leakage current requirements of SEV, VDE portable equipment, and (120 Volt) UL544 nonpatient medical equipment.

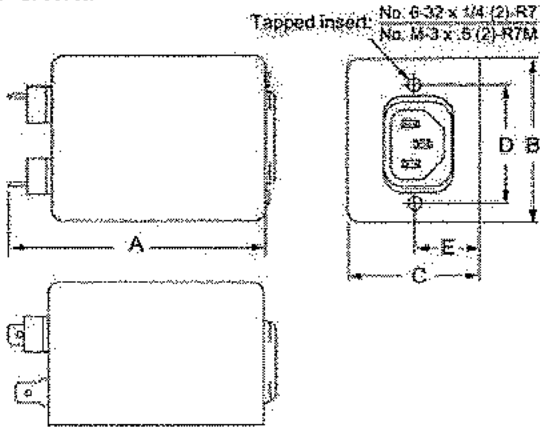
Electrical Schematic

Resistor location for reference only.

Case Style

Metric shown in italics.

R7 & R7M



Typical dimensions
Terminals: $\frac{.250}{6.35}$ (3) Holes: $\frac{.07}{1.8}$ Dia.(2) Slot: $\frac{.07 \times .16}{1.8 \times 4.1}$

* ER models only.

Specifications

	VR Models	ER Models
Maximum leakage current, each line-to-ground		
@ 120 VAC 60 Hz:	.4 mA	.21 mA
@ 250 VAC 50 Hz:	.7 mA	.36 mA
Hipot rating (one minute):		
line-to-ground	2250 VDC	
line-to-line	1450 VDC	
Operating frequency:	50/60 Hz	
Rated voltage:	120/250 VAC	

Rated current:	@120 VAC	@ 250 VAC
1VR/1ER	1A	1A
2VR/2ER	2A	2A
3VR/3ER	3A	3A
5VR/5ER	5A	5A
10VR/10ER	10A	8A
10VR6	10A	8A
20VR/20ER	20A	16A
20VR6	20A	16A

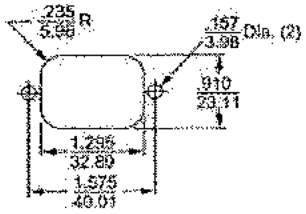
Minimum insertion loss in dB:
Line-to-ground in 50 ohm circuit

Current Rating	Frequency–MHz .15	.5	1	5	10	30
VR Models						
1A, 3A	30	65	65	65	65	65
2A, 5A, 10A, 20A	5	44	60	65	65	60
ER Models						
1A, 3A	25	60	65	65	65	65
2A, 5A, 10A, 20A	2	35	51	63	60	50

Line-to-line in 50 ohm circuit

Current Rating	Frequency–MHz .15	.5	1	5	10	30
VR, ER Models						
1A, 3A	–	–	65	60	54	46
2A, 5A, 10A, 20A	–	–	35	60	57	45

Recommended Panel Cutout (R7 & R7M)



Panel Cutout (Back mount)
Tolerance $\pm \frac{.005}{0.13}$

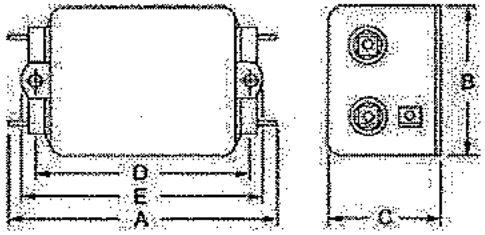
corcom
Libertyville, IL (847) 680-7400

USFCS PDF No. 1069 Rev.: 00

Case Styles

Metric shown in italics.

R1 (Except 20 Amp)

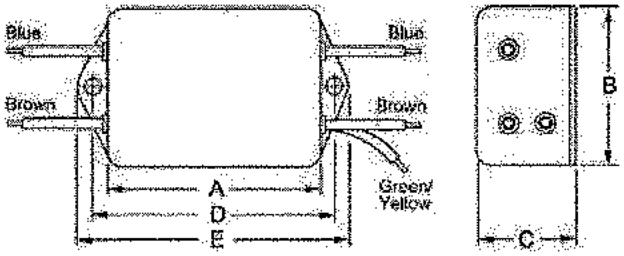


Typical dimensions

Terminals: $\frac{.250}{6.35}$ (5) Holes: $\frac{.07}{1.8}$ Dia.(4) Slot: $\frac{.07 \times .16}{1.8 \times 4.1}$

Mounting holes: $\frac{.188}{4.78}$ Dia. (2)

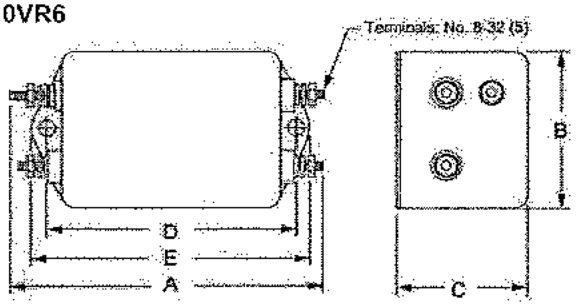
R3



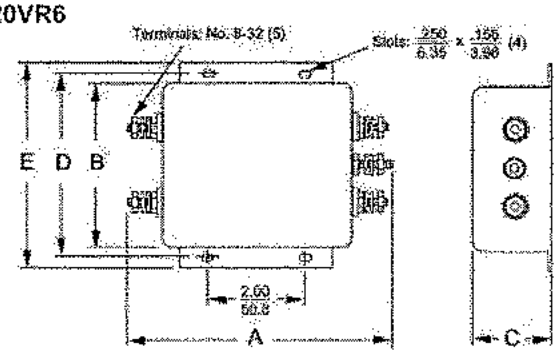
Typical dimensions

Wire leads: $\frac{4.0}{101.6}$ Min. Mounting holes: $\frac{.188}{4.78}$ Dia. (2)

10VR6



20VR6



Torque 16 ± 2 in.lb.

Note: Same layout for 20VR1 and 20ER1, except $\frac{.250}{6.35}$ (5) Terminals replace Screw Terminals of 20VR6

Line Cord

Line Cord No. GA400:

7 1/2 foot, 3-conductor line cord to mate with R7 models.

Case Dimensions

Metric shown in italics.

Part No.	A (max)	B (max)	C (max)	D ± .015 ± .38	E (max)
1VR1, 1ER1 2VR1, 2ER1	3.35 *85.1*	1.81 *46.0*	1.16 *29.5*	2.375 *60.33*	2.78 *70.6*
1VR3, 1ER3 2VR3, 2ER3	2.07 *52.6*	1.81 *46.0*	1.16 *29.5*	2.375 *60.33*	2.78 *70.6*
3VR1, 3ER1 5VR1, 5ER1	3.85 *97.8*	2.07 *52.6*	1.16 *29.5*	2.938 *74.63*	3.35 *85.1*
3VR3, 3ER3 5VR3, 5ER3	2.56 *65.0*	2.07 *52.6*	1.16 *29.5*	2.938 *74.63*	3.35 *85.1*
3VR7, 3VR7M 3ER7, 3ER7M	4.33 *110.0*	2.25 *57.2*	1.28 *32.5*	1.575 *40.01*	0.64 *16.3* †
5VR7, 5VR7M 5ER7, 5ER7M	4.33 *110.0*	2.25 *57.2*	1.28 *32.5*	1.575 *40.01*	0.64 *16.3* †
10VR1, 10ER1	3.85 *97.8*	2.07 *52.6*	1.53 *38.9*	2.938 *74.63*	3.35 *85.1*
10VR3, 10ER3	2.56 *65.0*	2.07 *52.6*	1.53 *38.9*	2.938 *74.63*	3.35 *85.1*
10VR6	3.96 *100.6*	2.07 *52.6*	1.53 *38.9*	2.938 *74.63*	3.35 *85.1*
10VR7, 10VR7M 10ER7, 10ER7M	*4.33* *110.0*	*2.25* *57.2*	*1.53* *38.9*	*1.575* *40.01*	*0.88* *22.4* †
20VR1, 20ER1	5.23 *132.8*	3.37 *85.6*	1.53 *38.9*	3.75 *95.25*	4.2 *106.7*
20VR6	5.34 *135.6*	3.37 *85.6*	1.53 *38.9*	3.75 *95.25*	4.2 *106.7*

† $\frac{\pm .02}{\pm .5}$

Ordering Information

Consult your local Corcom sales representative for pricing.

Available Part Numbers

1VR1	5VR7	1ER1	5ER3
1VR3	5VR7M	1ER3	5ER7
2VR1	10VR1	2ER1	5ER7M
2VR3	10VR7M	2ER3	10ER1
3VR1	10VR6	3ER1	10ER3
3VR3	10VR7	3ER3	10ER7
3VR7	10VR7M	3ER7	10ER7M
3VR7M	20VR1	3ER7M	20ER1
5VR1	20VR6	5ER1	
5VR3			

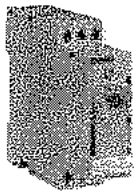
Line Cord: No GA400

Libertyville, IL (847) 680-7400

Level control

ENR

- Adjusting two levels (min./max.)
- Monitoring filling (UP) or emptying (DOWN), selected by a switch on the front panel.
- Probes supplied with AC current.
- Sensitivity adjustable on front panel from 5 kΩ to 100 kΩ.



Specifications

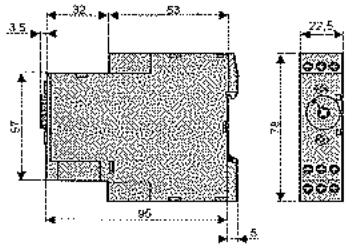
Type	Characteristics	Voltages	Code
ENR	Monitoring filling UP Monitoring emptying DOWN	24 V AC	84 870 201
		48 V AC	84 870 202
		120 V AC	84 870 203
		230 V AC	84 870 204

General characteristics

Operating range	0,85 → 1,10 x Un
Maximum power consumption	3 VA
Adjustable sensitivity	5 kΩ → 100 kΩ
Measurement accuracy (at maximum sensitivity)	± 30 %
Electrode voltage (max)	24 V AC (50/60 Hz)
Electrode current (maximum)	1 mA (50/60 Hz)
Maximum cable capacity	10 nF
Response time high level	300 ms
Response time low level	500 ms
Output relay (according to AC1 resistive load)	1 AgNi changeover relay 8 A AC max.
Galvanic isolation via transformer (4 kV, 8 mm creepage distance)	Class II VDE 0551
Isolation of contacts and electrodes from power supply	2,5 kV AC
Operating temperature range (°C)	-20 → +50°C
Storage temperature range (°C)	-40 → +70°C
Weight (g)	150

Dimensions

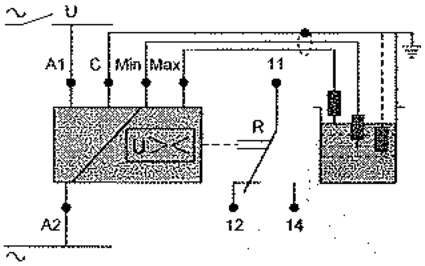
ENR



To order, see page 8

Connections

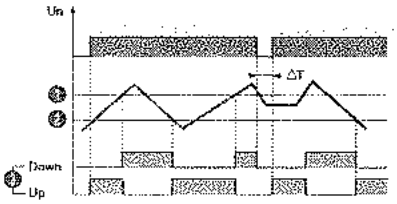
ENR



A1-A2 : power supply

Principles

Monitoring filling or emptying ENR



Maximum level
Minimum level
Output relay : Down or Up

Operating principle
Monitoring maximum and/or minimum levels of conductive liquids (tap water, sea water, waste water, chemical solutions, coffee, etc).
The principle is based on measuring the apparent resistance of the liquid between two submerged probes. When this value is lower than the preset threshold displayed on the unit's front panel, the output relay changes state. To prevent any occurrences of electrolysis, an AC current is passed through the probes. Areas of application include the agri-food, chemical and other industries.

Adjusting two levels : Minimum/Maximum
The output relay changes state when the level of liquid reaches the maximum electrode, with the minimum electrode submerged. It returns to its initial state when the minimum probe is no longer in contact with the liquid.

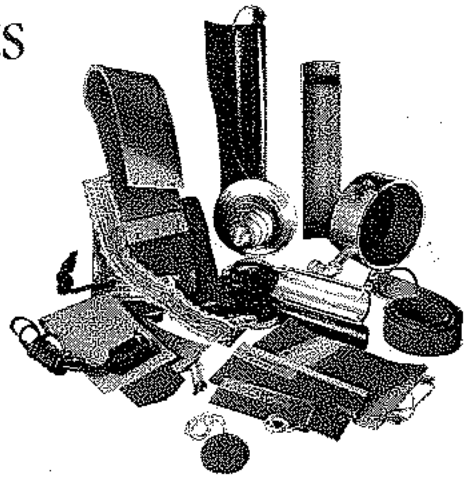
Note
If the power break T lasts for 1 second or more, the relay reenergises instantly when in "UP" mode and is de-energised when in "DOWN" mode.

Other informations

The probe cable (maximum length 100 metres) does not have to be screened, but avoid mounting it in parallel with the power supply cables. A screened cable can be used with the screening connected to the common terminal.

Flexible Heater Products

Overview



- **Flexible Heaters, Insulation Blankets, Insulation Covers.**
- **Two Different Element Types: Wire Wound or Etched Foil**
- **Silicone Rubber Standard and Stock Products**
- **Drum Heaters**
- **Enclosure and General Purpose Air Heaters**
- **Flexible and Molded Thermal Insulation Products**
- **Up to 600 Volt**
- **Extensive Stock Program**

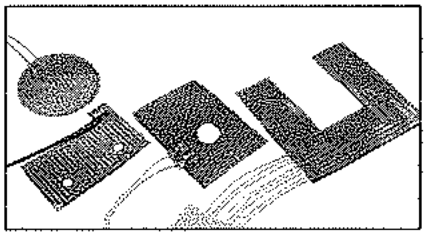
Description

Flexible Heaters and Thermal Insulation Products are flexible in design and application to fit your specific needs. Chromalox provides dedicated engineering support to customize our Flexible heaters per your requirements. Most size, shape or contour can be used to apply direct and efficient heat without sacrificing dependability.

Various insulating materials are available to suit your application environment. Temperature controlling devices can be molded directly to the elements to provide precise system operation. Power requirements can be minimized and heat-up time optimized by applying heat directly to the part. Cool-down time is shortened and distributed wattages or multiple heater circuit designs are possible with Chromalox flexible heating elements.

Features

- Flexible Heaters can be made to meet electrical and contour specifications.
- Holes and Slots can be incorporated for positioning on complex surfaces,
- Fast heat-up and cooling with accurate temperature control is possible.
- Wide choice of electrical terminations including solderless connectors, terminals, stranded wire leads, cords and plugs.



- Thin profile depending on choice of construction and insulation barrier.
- Distributed wattage multiple circuits and designs are available.
- Complete system development available which includes heater, sensor and temperature controller.

Applications

Flexible/Molded Products are suited for application environments in a wide-range of industries:

- Medical
- Semiconductor
- Power Systems/Motors
- Communications
- Food Service
- Laminating/Forming
- Chromatography
- Printing/Copying
- Vending
- Transportation & Aerospace
- Manufacturing
- Military
- Tank/Vessel Heating

Flexible Heaters

Ordering Guidelines

Ordering Information

To Order — *Complete the Model Number using the Matrix provided.*

Model	Flexible Heating Elements
SL-N	General Purpose Heater
SL-B	Enclosure and Air Heater

Code	Special Mounting Features			
N[a]	None	V[d]	Velcro®	a. SL
A[b]	Adhesive (PSA)	S[d]	Spring	b. SL
B[c]	Vulcanized	SC[d]	Spring Clasp	c. SL
F[c]	Foil Backing	H[d]	Hooks	d. SL
I[c]	Insulation	C[e]	Preformed	
E[d]	Eyelets/Mounting Holes			

Code	Physical Dimensions (In.)[1]
xx.xx	Smallest Dimensions (for circular shaped heaters use designator "xx" only)
xx.xx	Largest Dimensions (for circular shaped heaters, add "OD" to the indicated outside diameter, i.e., 8.25OD)

Code	Control Options
0	None
P	Preset Thermostat specify temperature (300°F max.)
A	Adjustable Thermostat; range 70-140°F, 70-190°F or 70-425°F
J	Type J Thermocouple
K	Type K Thermocouple
R	RTD: specify rating
D	TFD: specify rating
TF	Thermal Fuse: specify high limit
T	Thermistor: specify rating

Code	
xx	Lead Length (In.): 10" Standard Power Cord Length (Ft.): 6' Standard

Code	Lead Type
	Silicone Rubber Insulated Leads
T	Teflon® Insulated Leads
CGM	Power Cord w/o Plug, w/ Mesh Grid
CPGM	Power Cord w/ Plug, w/ Mesh Grid
CG	Power Cord with Integral Grounding, w/o Plug
CPG	Power Cord with Integral Grounding, w/ Plug

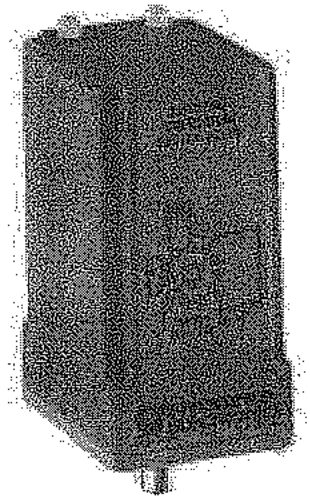
Code	Electrical Specifications
V	- Voltage
W	- Wattage - Single Phase is Standard (use "3P" for three phase)

SL-	N	5	25	0	10	120V	100W	Typical Model Number
SL-	AI	25	25	40P/120P	6CPG	480V	400W	Typical Model Number

1. Cutouts, notches, etc., must be indicated with accompanying detail drawings to show angle of curvature.
2. If adding abrasion protection, add designator. "F" for silicone rubber coated Fiberglas® Sleeving or "A" for Armor Braiding.
3. Consult your Local Chromalox Sales office for recommended grounding methods.

Non-Volatile Latching Temperature Switch Relay
SPM-120-ACA/-ADA

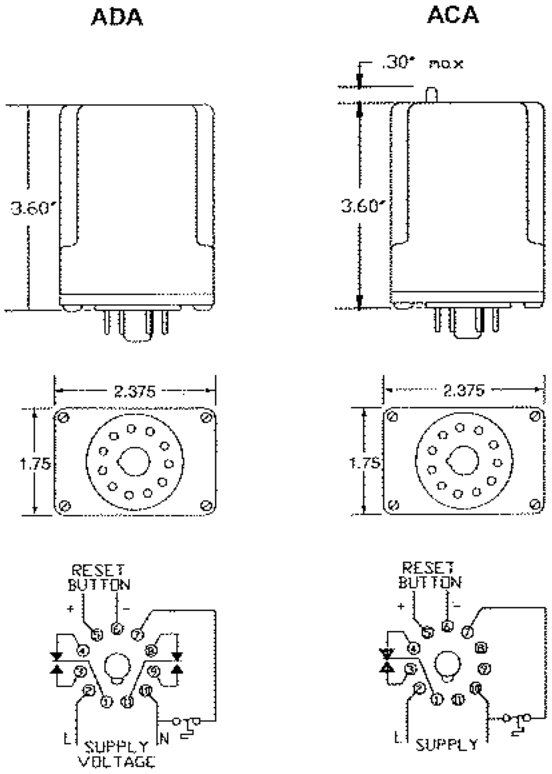
The non-volatile latching temperature switch relay monitors a normally-closed-low temperature switch. It incorporates a bistable relay that retains its state during power failures. LEDs indicate the status of the relay, and connections for an external reset button are provided for manual control. The reset inputs of multiple units may be connected to a single push button as long as proper polarity is observed when making the connections. Under normal conditions the temperature switch is closed and the relay is de-energized. When the temperature switch opens, the relay energizes and latches on until the temperature switch recloses and the reset button is pressed. The unit will function properly with zero to 2 k ohm of resistance in series with the temperature switch.



c UL us
UL Recognized

Specifications

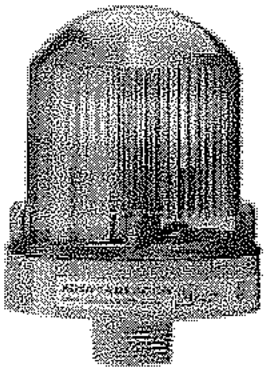
Supply Voltage:	120 VAC, 50/60 Hz
Temperature Switch	
Voltage:	12 VDC
Current:	2 mA max.
Contact Rating	
SPM-120-ACA:	SPDT, 10 A @ 250 VAC Resistive, 360 VA Ind.
SPM-120-ADA:	DPDT, 10 A @ 250 VAC Resistive, 360 VA Ind.
Power Consumption:	2 VA
Temperatures	
Operate:	–20°C to +55°C
Storage:	–40°C to +85°C
Response Times	
Operate:	10 ms (approximately)
Release:	1 sec (approximately)
Life Expectancy	
Mechanical:	30 Million Operations
Electrical:	50,000 Operations @ Rated Load
Duty Cycle:	Continuous
Indicators	
SPM-120-ACA:	Green LED illuminates under normal conditions Red LED illuminates under fault conditions
SPM-120-ADA:	None
Package:	11 Pin plug-in extended "A" style enclosure
Agency Approvals:	UL Recognized File #E55826



SPECIAL CONTROLS

Edwards® AdaptaBeacon® 104ST Series Strobe Flashing Lights

PLC Compatible



Cat. No. 104ST

Features

- PLC compatible
- Available in 120V AC 50/60 Hz
- NEMA 4X Enclosure
- 300,000 peak candela
- 18 inch wire leads

Description

The Edwards 104ST Series AdaptaBeacon flashing lights are designed to provide a bright strobe indication utilizing special optics within a shatter resistant polycarbonate lens mounted on a polycarbonate/ABS blend base.

Agency Approvals

- UL Listed
- NEMA 4X enclosure
- CSA Certified
- CE Marked

Specifications

- Lenses available in five colors: amber, blue, clear, green and red

Installation

Suitable for indoor or outdoor installation. When mounted outdoors lens should be mounted facing up. May be panel or conduit mounted either horizontally or vertically. However, vertical installation ensures maximum beam width projection.

Double (internal/external) threaded mounting nipple suitable for direct panel mounting or 1/2" (13mm) conduit mounting.

PLC Compatibility

The electrical input load requirements for PLC compatible signaling devices are listed in Table 1. Signaling devices may be directly connected to output cards that meet these input load requirements.

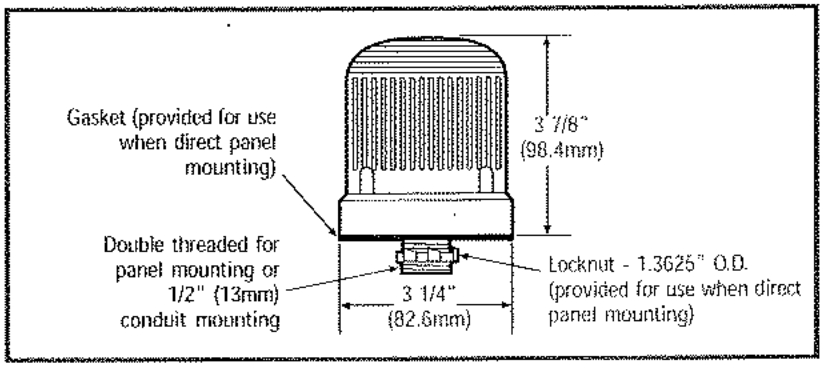
Applications

Edwards flashing strobe lights are particularly effective in high noise level areas, especially where ear protection must be worn and audible signals may not be heard or understood. They can advise personnel in manufacturing and process areas when an operation is starting or stopping. Often used to signal malfunctions in equipment, such as assembly line jams. Can warn personnel that they are entering a restricted area or an area of high danger. Ideal for use where strobe intensity is required in a smaller panel mount configuration.

Table 1. PLC Compatibility

Cat. No.	Operating voltage Volts*	Max. off state leakage current mA	Continuous on current mA	Surge (inrush/duration) A/mSeconds**
104ST()-N5	120V AC	5	120	2.1/1

* All AC volts at 60 Hz ** Amps/milliseconds



Ordering and Technical Data

Cat. No.	Lens Color	Replacement Lens	Electrical Rating	Replacement Lamp	Strobe Tube Life
104STA-N5	Amber	104-LA	120V 50/60 Hz	91B-ST	3,000 hr.*
104STB-N5	Blue	104-LB	0.12 Amps		
104STC-N5	Clear	104-LC			
104STG-N5	Green	104-LG			
104STR-N5	Red	104-LR			

*Calculated strobe tube life at operating power to 75% efficiency.

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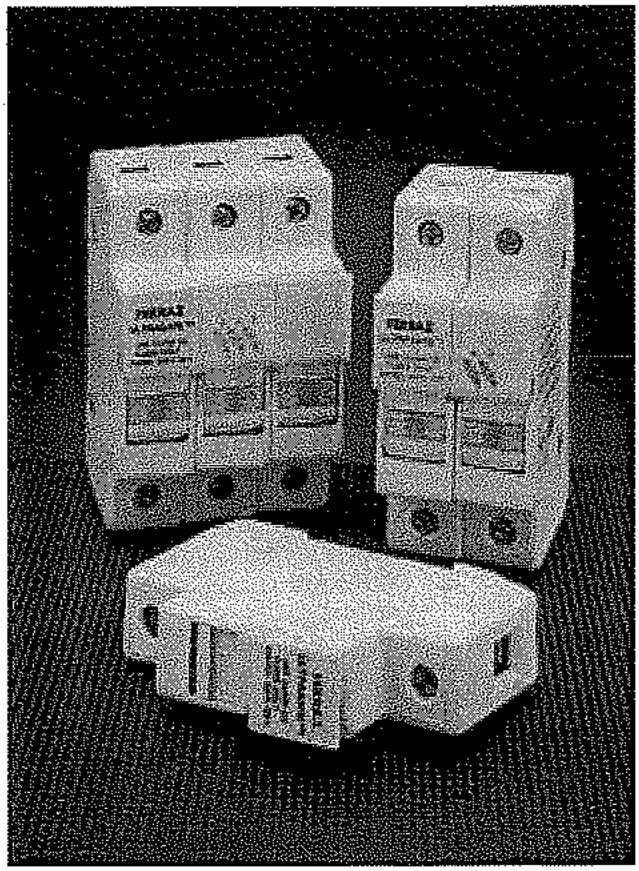
CHESHIRE, CT 06410
www.edwards-signals.com

EDWARDS
SIGNALING PRODUCTS

Ferraz Shawmut

USCC & USM 24, 48 & 600 VOLT / ULTRASAFE™ FUSEHOLDERS



ULTRASAFE MODULAR FUSE HOLDERS

Ferraz Shawmut ULTRASAFE™ modular 24, 48 and 600 volt Fuse Holders introduce a new level of safety for Class CC (USCC) and Midget 1-1/2" x 13/32" (USM) as well as DC rated fuses up to 30 amperes. ULTRASAFE holders qualify as "finger safe" under IEC and DIN standards to an IP2 grade of protection, including fuse changing (with the flick of a finger). ULTRASAFE holders are available in 1, 2, 3 or 4 poles, with or without blown-fuse indicators in each pole. AC indicators are orange and DC are red. The multi-pole units can also be made up by ordering pin-tie handles for field assembly. ULTRASAFE holders save up to 15% mounting space and any combination can be snapped onto 35mm DIN rail for extra savings in panel building time. ULTRASAFE holders with Class CC fuses chosen for Type "2" protection give one of the safest protection packages in the industry. Ultrasafe body material is tough and durable polyamide, with exceptional insulating properties.

HIGHLIGHTS:

- Finger Safe
- Optional Indicator Lights
- DIN Rail Mount
- Compact Footprint
- Quick, Easy Fuse Change

APPLICATIONS:

- All circuits up to 600 volts for motors, control circuits, transformers, etc.
- Non-load disconnect
- 12, 24 and 48 volt DC circuits

Ratings

- 600VAC, 30A
  Min. voltage to operate indicator light: 90VAC
  [Less than 0.7 mA leakage current at 600V]
- 24VDC, 30A
- 48VDC, 30A
- Withstand rating:
  Class CC 200kA I.R.
  Midget Fuse 100kA I.R.

Approvals

- All Ultrasafe Fuse Holders meet the requirements of UL512
- UL Listed
  Class CC
  Guide IZLT, File E52283
- UL Recognized
  Component
  Midget
  Guide IZLT2, File E52283
- CSA Certified
  Class CC & Midget
  C22.2, Class 6225
  File 32169

RECOMMENDED FUSE USAGE

USCC ..... use with **ATDR*, ATMR, ATQR**

USM ..... use with **ATQ, ATM*, A6Y-2B, A25Z-2, TRM, OTM, A13X-2, GFN, GGU, A60Q-2**

*** Recommended for DC Applications**

Ferraz Shawmut

USCC & USM 24, 48 & 600 VOLT / ULTRASAFE™ FUSEHOLDERS

For use with Class CC Fuses

CATALOG NO.	DESCRIPTION
USCC1	1 pole
USCC1I	1 pole with indicator
USCC2	2 pole
USCC2I	2 pole with indicators
USCC3	3 pole
USCC3I	3 pole with indicators
USCC3IN	3 pole with indicators and a 4th neutral pole
USCC3N	3 pole with a 4th neutral pole
USCC4	4 pole
USCC4I	4 pole with indicators

For use with Midget (1-1/2" x 13/32") Fuses

USM1	1 pole
USM1I	1 pole with indicator
USM2	2 pole
USM2I	2 pole with indicators
USM3	3 pole
USM3I	3 pole with indicators
USM3IN	3 pole with indicators and a 4th neutral pole
USM3N	3 pole with a 4th neutral pole
USM4	4 pole
USM4I	4 pole with indicators

Neutral Link Pole

USN	1 Pole with Integral Neutral Link

Accessories

USPTH2	Pin-tie handle for 2 poles
USPTH3	Pin-tie handle for 3 poles
USPTH4	Pin-tie handle for 4 poles

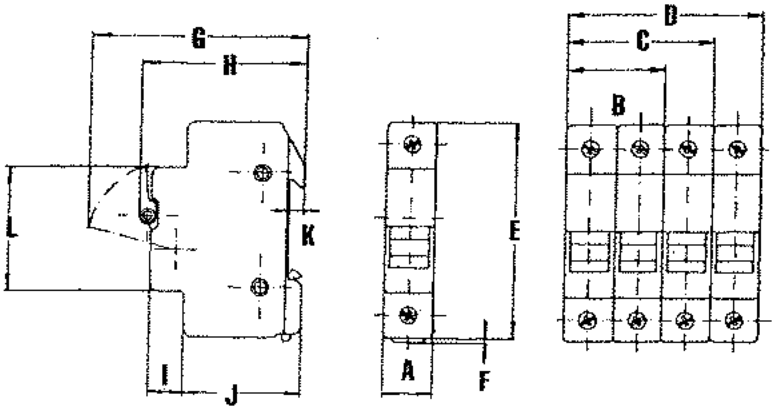
For use with DC rated Class CC & Midget Fuses

PART NUMBER	INDICATOR TYPE	OPERATING VOLTAGE	LEAKAGE CURRENT
USM1I-DC24	LED	12 to 24 VDC	10mA max.(@24vdc)
USM1I-DC24P	LED	20 to 24 VDC	1mA max.(@24vdc)
USM1I-DC48	LED	35 to 48 VDC	10mA max.(@48vdc)
USCC1I-DC24	LED	12 to 24 VDC	10mA max.(@24vdc)
USCC1I-DC48	LED	35 to 48 VDC	10mA max.(@48vdc)

H

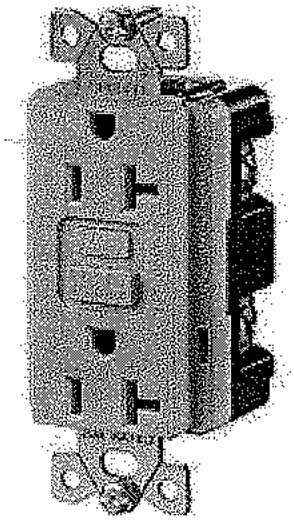
Dimensions

DIMENSION	mm	in
A	17.5	0.69
B	35.0	1.38
C	52.5	2.07
D	70.0	2.76
E	76.0	3.07
F	2.5	0.10
G	78.0	3.07
H	59.0	2.32
I	12.5	0.49
J	42.5	1.67
K	5.0	0.20
L	45.0	1.77

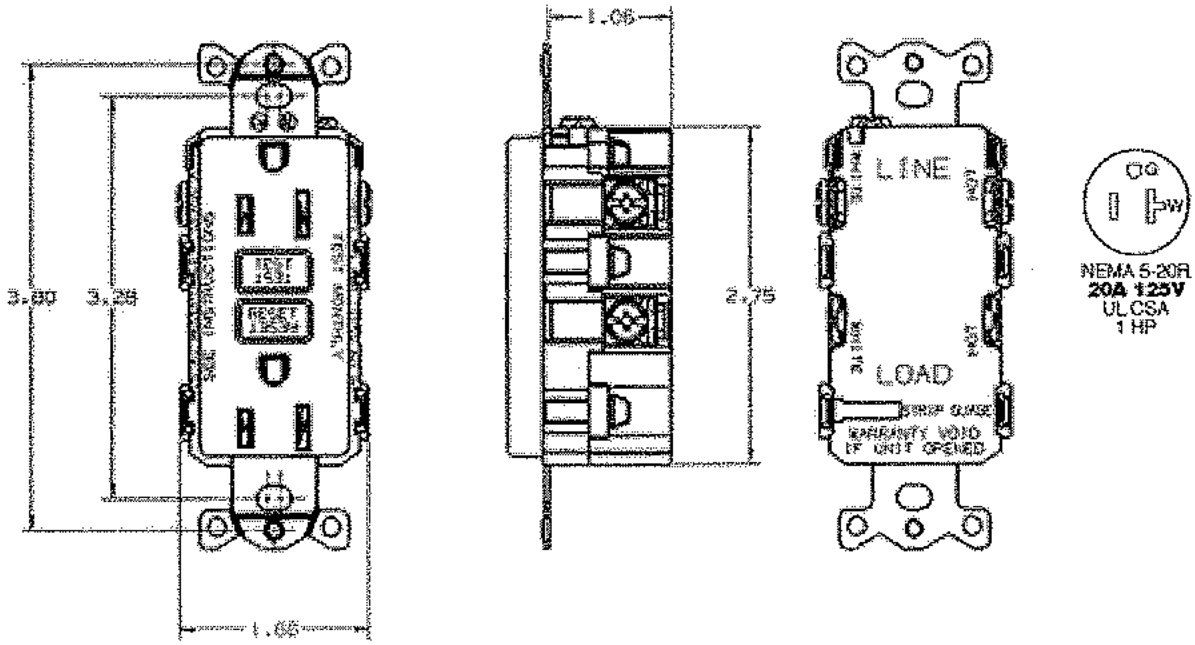


Terminal screws: Phillips/slot head
Suggested screw torque: 14.75 in-lbs.
Connector type: Pressure plate
Wire range: #6 to #14 (solid/stranded Cu)
Load-break disconnect: No

Product Datasheet
HUBBELL GFR5352IA
Circuit Guard® Commercial Specification Grade GFCI Duplex Receptacle



Amperage 20A Voltage 125V
Color Gray
Description Heavy Duty Straight Blade Duplex GFCI Receptacle
Maximum Current Feed-Thru 20 Amps
Poles and Wires 2 Pole, 3 Wire Grounding
Certification Meets 2003 UL 943 for GFCI's, UL 943 Class A for GFCIs, UL File E41978. CSA Certified.
Code Meets 2002 NEC Requirements.
Top Material Polycarbonate Base Material Polycarbonate
Mounting Strap Material .05" (1.3) Steel-Zinc Plated
Terminal Screw Material #8-32 Steel- Plated
Ground Screw Material #8-32 Steel (Green)
Mounting Screw Material Steel-Zinc Plated
Test/Reset Buttons Material Polycarbonate
Dielectric Withstands 1500V minimum
Trip Level 4 to 6 mA. **Trip Time** .025 Sec. Nominal.
Voltage Range 120V AC +10% - 15%. Frequency 60 Hz.
Maximum Interrupting Capacity 2000A.
Operating Temperature -35°C to +66°C or -30°F to +150°F.
Maximum Humidity 95%.
Terminal Identification in accordance with UL 498 (X, Y, Z, White, Green)
Product Identification Ratings are a permanent part of the device. Flammability 94-V2
Terminal Accommodation #14 AWG - #12 AWG Solid or Stranded Copper



Hubbell Incorporated (Delaware)
185 Plains Road
Milford, CT 06460-2420
Ph: (203) 882-4800
Fax: (800) 255-1031

HUBBELL®
Wiring Device-Kellems

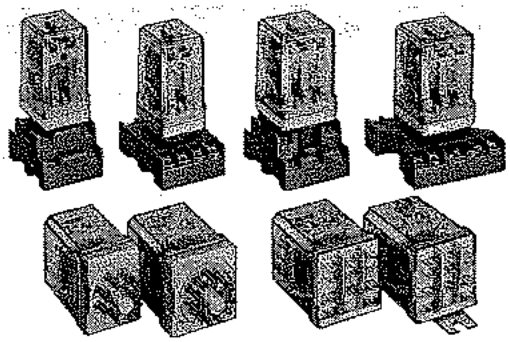
12/08/03

USFCS PDF No. 585 Rev.: 03

RR Series — General Purpose Power Relays

Key features of the RR series include:

- **High reliability and long service life**
- **Available in octal (8- and 11-pin) or square (11-blade) base**
- **Options include check button for test operation, indicator light, and side flange**
- **DIN rail, surface and panel type sockets available for a wide range of mounting applications**



UL Recognized
File Nos. E67770

CSA Certified
File No. LR35144

TÜV PRODUCT SERVICE
File No. BL951113332319*
* Pin Style Only
(does not apply to blade style)

CE *
* Pin Style Only

E

Specifications

Contact Material	Silver
Contact Resistance	30mΩ maximum (initial value)
Minimum Applicable Load	24V DC/10mA, 5V DC/20mA (reference value)
Operating Time	25ms maximum
Release Time	25ms maximum
Maximum Continuous Applied Voltage (AC/DC) at 20°C	110% of the rated voltage
Minimum Operating Voltage (AC/DC) at 20°C	80% of the rated voltage
Drop-Out Voltage (AC) at 20°C	30% of the rated voltage
Drop-Out Voltage (DC) at 20°C	15% of the rated voltage
Power Consumption	AC: approximately 3VA (50Hz), 2.5VA (60Hz) DC: approximately 1.5W
Insulation Resistance	100MΩ minimum (measured with 500V DC megger)
Dielectric Strength	**Pin** (RR2P, RR3PA) Between live and dead parts: 1,500V AC, 1 minute Between contact circuit and operating coil: 1,500V AC, 1 minute Between contact circuits: 1,500V AC, 1 minute (1,000V AC between NO-NC contacts)
	Blade (RR1BA, RR2BA, RR3B) Between live and dead parts: 2,000V AC, 1 minute Between contact circuit and operating coil: 2,000V AC, 1 minute Between contact circuits: 2,000V AC, 1 minute Between contacts of same polarity: 1,000V AC, 1 minute
Frequency Response	1,800 operations/hour
Temperature Rise	Coil: 85°C maximum Contact: 65°C maximum
Vibration Resistance	0 to 6G (55Hz maximum)
Shock Resistance	100N (approximately 10G)
Life Expectancy	Electrical: over 500,000 operations (120V, 50/60Hz, 10A) Mechanical: over 10,000,000 operations
Operating Temperature	-30 to +70°C
Weight	RR2P: 90g, RR3P/RR3PA: 96g (approximately) RR1BA/RR2BA/RR3B: 82g (approximately)

Ordering Information

Order standard voltages for fastest delivery. Allow extra delivery time for non-standard voltages.

Basic Part No.		*Coil Voltage:*
RR3PA-U	–	*AC120V*

USFCS PDF No. 1184 Rev.: 8-02

Part Numbers

Part Numbers: RR Series with Options

Termination	Contact Configuration	Basic Part No.	Indicator Light	Check Button	Light and Check Button	Side Flange
P, PA (pin)	DPDT	RR2P-U	RR2P-UL	RR2P-UC	RR2P-ULC	—
	3PDT	RR3PA-U	RR3PA-UL	RR3PA-UC	RR3PA-ULC	—
B, BA (blade)	SPDT	RR1BA-U	RR1BA-UL	RR1BA-UC	RR1BA-ULC	RR1BA-US
	DPDT	RR2BA-U	RR2BA-UL	RR2BA-UC	RR2BA-ULC	RR2BA-US
	3PDT	RR3B-U	RR3B-UL	RR3B-UC	RR3B-ULC	RR3B-US

1. RR1BA, RR2BA, and RR3PA are U.S. standard terminal arrangements.
2. For diode option on DC coils please consult factory.

Ratings

Coil Ratings

Rated Voltage		Rated Current ±15% at 20°C		Coil Resistance ±10% at 20°C	Inrush Current	Inductance	
		60Hz	50Hz			Energizing	De-Energizing
AC	6V	420mA	490mA	4.9Ω	720mA	0.04H	0.02H
	12V	210mA	245mA	18Ω	365mA	0.15H	0.08H
	24V	105mA	121mA	79Ω	182mA	0.57H	0.32H
	120V	20.5mA	24mA	2100Ω	35mA	15H	8.2H
	240V	10.5mA	12.3mA	8330Ω	18mA	57H	32H
DC	6V	240mA		25Ω	N/A		
	12V	120mA		100Ω			
	24V	60mA		400Ω			
	48V	30mA		1600Ω			
	110V	13mA		8460Ω			

Contact Ratings

	Resistive			Inductive			Motor Load
Voltage	Nominal	UL	CSA	Nominal	UL	CSA	UL
30V DC	10A	10A	10A	7.5A	7A	7.5A	—
110V DC	0.5A	—	—	0.3A	—	0.5A	—
120V AC	10A	10A	10A	7.5A	7.5A	7.5A	1/4 hp
240V AC	7.5A	10A	10A	5A	7A	7A	1/3 hp

Inductive load: cos ø = 0.3, L/R = 7ms.

Applicable Sockets

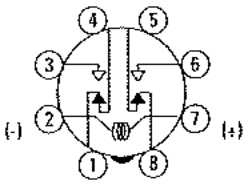
Part Numbers: Sockets

Relays	Standard DIN Rail Mount	Finger-Safe DIN Rail Mount	Panel Mount
RR2P	SR2P-05 SR2P-06	SR2P-05C	SR2P-51
RR3PA	SR3P-05 SR3P-06	SR3P-05C	SR3P-51
RR1BA RR2BA RR3B	SR3B-05	—	SR3B-51

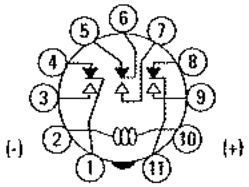
Springs & Clips (optional)	
Part Numbers	Use With
SR2B-02F1	SR2P-05, -05C, -06
SR3P-01F1	SR2P-51
SR3B-02F1	SR3P-05, -05C, -06
SR3P-01F1	SR3P-51
SR3B-02F1	SR3B-05 SR3B-51

See Section F for details on sockets. All DIN rail mount sockets listed can be mounted using DIN rail BNDN1000.

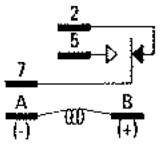
Internal Circuit



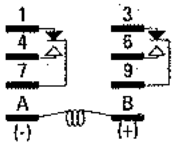
RR2P



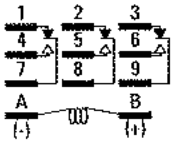
RR3PA



RR1BA



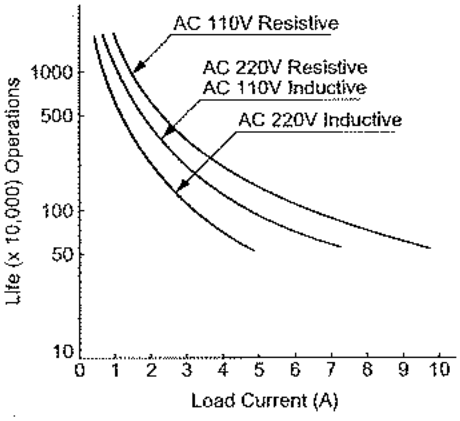
RR2BA

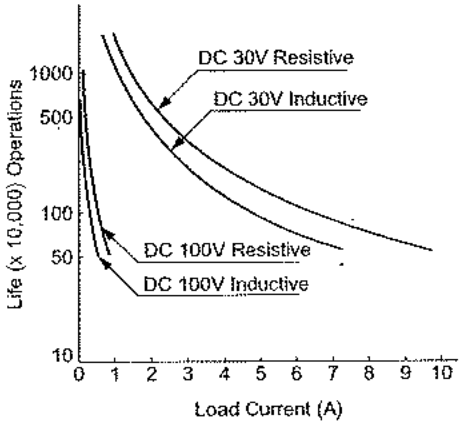


RR3B

E

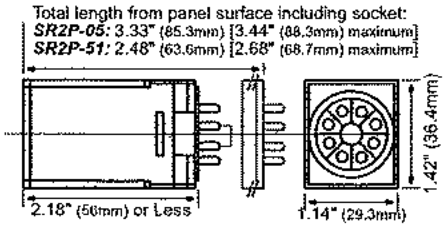
Electrical Life Curves



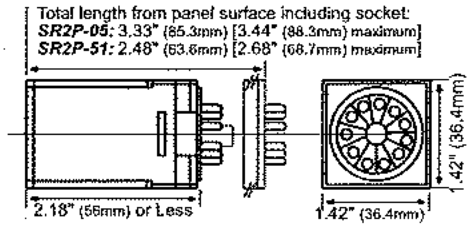


Dimensions

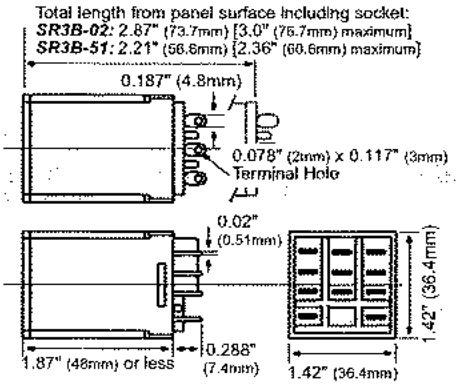
8-Pin
RR2P



11-Pin
RR3PA

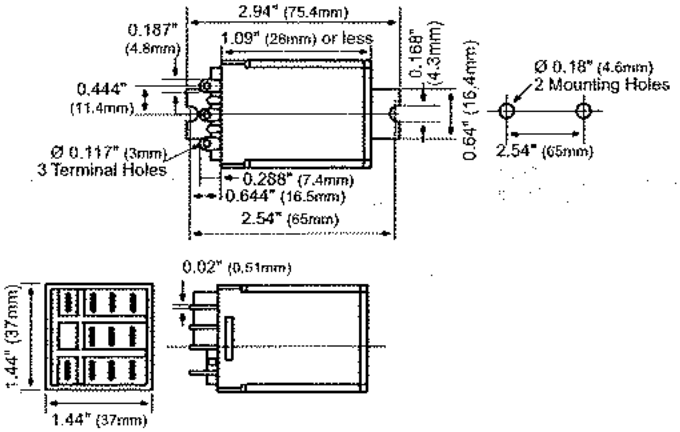


Blade
RR1BA, RR2BA, RR3B



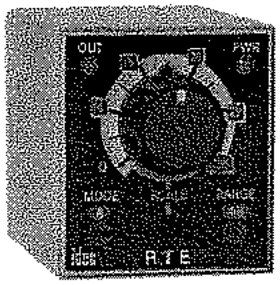
Note: *Dimensions in [ ] include hold-down spring.*

Side Flange
RR1BA-US, RR2BA-US, RR3B-US



E

RTE Series — Analog Timers



NEW DESIGN!

Key features of the RTE series include:

- **20 time ranges and 10 timing functions**
- **Time delays up to 600 hours**
- **Space-saving package**
- **High repeat accuracy of ± 0.2%**
- **ON and timing OUT LED indicators**
- **Standard 8- or 11-pin and 11-blade termination**
- **2 form C delayed output contacts**
- **10A Contact Rating**

TÜV PRODUCT SERVICE Cert. No. E995091333231 6 (EMC, RTE)
cert. No. BL960813332355 (LVD, RTE)

c UL us UL Listed File No. E66043

CE

General Specifications

Operation System		Solid state CMOS Circuit
Operation Type		Multi-Mode
Time Range		0.1sec to 600hours
Pollution Degree		2 (IE60664-1)
Over voltage category		III (IE60664-1)
Rated Operational Voltage	AF20	100-240V AC(50/60Hz)
	AD24	24V AC(50/60Hz)/24V DC
	D12	12V DC
Voltage Tolerance	AF20	85-264V AC(50/60Hz)
	AD24	20.4-26.4V AC(50/60Hz)/21.6-26.4V DC
	D12	10.8-13.2V DC
Input off Voltage		Rated Voltage x10% minimum
Ambient Operating Temperature		-20 to +65°C (without freezing)
Ambient Storage and Transport Temperature		-30 to +75°C (without freezing)
Relative Humidity		35 to 85%RH (without condensation)
Atmospheric Pressure		80kPa to 110kPa (Operating), 70kPa to 110kPa (Transport)
Reset Time		100msec maximum
Repeat Error		±0.2%, ±20msec*
Voltage Error		±0.2%, ±20msec*
Temperature Error		±0.5%, ±20msec*
Setting Error		±10% maximum
Insulation Resistance		100MΩ minimum (500V DC)
Dielectric Strength		Between power and output terminals: 2000V AC, 1 minute Between contacts of different poles: 2000V AC, 1 minute Between contacts of the same pole:1000V AC, 1 minute
Vibration Resistance		10 to 55Hz amplitude 0.5mm2 hours in each of 3 axes
Shock Resistance		Operating extremes: 98m/sec^2 (10G) Damage limits: 490m/sec^2 (50G) 3 times in each of 3 axes
Degree of Protection		IP40 (enclosure) (IEC60529)

Power Consumption (Approx.)	TYPE		RTE-P1, -B1	RTE-P2, -B2
	AF20	120V AC/60Hz	6.5VA	6.6VA
		240V AC/60Hz	11.6VA	11.6VA
	24V AC 60Hz/DC		3.4VA/1.7W	3.5VA/1.7W
	D12		1.6W	1.6W
Mounting Position			Free	
Dimensions	RTE-P1, P2		40Hx 36W x 77.9D mm	
	RTE-B1, B2		40Hx 36W x 74.9D mm	
Weight (Approx.)			RTE-P1	RTE-P2 / RTE-B1, -B2
			87g	89g / 85g

**For the value of the error against a preset time, whichever the largest.*

Contact Ratings

Contact Configuration		2 Form C, DPDT (Delay output)
Allowable Voltage / Allowable Current		240V AC, 30V DC / 10A
Maximum Permissible Operating Frequency		1800 cycles per hour
Rated Load	Resistive	10A 240V AC, 30V DC
	Inductive	7A 240V AC, 30V DC
	Horse Power Rating	1/6 HP 120V AC, 1/3 HP 240V AC
Life	Electrical	500,000 op. minimum (Resistive)
	Mechanical	50,000,000 op. minimum

RTE Table of Contents

Specifications —G-8
Part Number Guide — G-9
Part Number List — G-9
RTE Timing Diagrams — G-10
RTE Accessories — G-11
Instructions: Setting Timer — G-13
RTE Dimensions — G-14
General Timing Diagrams — G-4

Part Numbering Guide

RTE series part numbers are composed of 4 part number codes. When ordering a RTE series part, select one code from each category.
Example: RTE-P1AF20

RTE	—	P	1	—	AF20
① Series		② Terminal Style	③ Function Group		④ Input Voltage

Part Numbers: RTE Series

	Description	Part Number Code	Remarks
① Series	RTE series	RTE	For internal circuits, see next page.
② Terminal Style	Pin	P	Select one only.
	Blade	B	
③ Function Group	ON-delay, interval, cycle OFF, cycle ON	1	Each function group has different timing functions. See page G-4.
	ON-delay, cycle OFF, cycle ON, signal ON/OFF delay, OFF-delay, one-shot	2	
④ Input Voltage	100 to 240V AC(50/60Hz)	AF20	
	24V AC(50/60Hz)/24V DC	AD24	
	12V DC	D12	

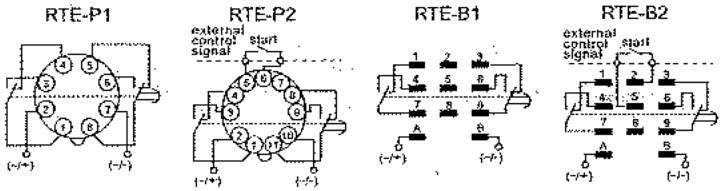
Part Number List

Part Numbers

New Part Number	Voltage	Terminals	Obsolete Part Number
RTE-B1AD24	24V AC/DC	Blade	RTE-B11-24V
			RTE-B12-24V
RTE-B1AF20	100 - 240V AC	Blade	RTE-B11-AC120V
			RTE-B12-AC120V
RTE-B1D12	12V DC	Blade	RTE-B11-12V
			RTE-B12-12V
RTE-B2AD24	24V AC/DC	Blade	RTE-B21-24V
			RTE-B22-24V
RTE-B2AF20	100 - 240V AC	Blade	RTE-B21-AC120V
			RTE-B22-AC120V
RTE-B2D12	12V DC	Blade	RTE-B21-12V
			RTE-B22-12V
RTE-P1AD24	24V AC/DC	8 Pin	RTE-P11-24V
			RTE-P12-24V
RTE-P1AF20	100 - 240V AC	8 Pin	RTE-P11-AC120V
			RTE-P12-AC120V
RTE-P1D12	12V DC	8 Pin	RTE-P11-12V
			RTE-P12-12V
RTE-P2AD24	24V AC/DC	11 Pin	RTE-P21-24V
			RTE-P22-24V
RTE-P2AF20	100 - 240V AC	11 Pin	RTE-P21-AC120V
			RTE-P22-AC120V
RTE-P2D12	12V DC	11 Pin	RTE-P21-12V
			RTE-P22-12V

1. *For schematics, see page G-10.*
2. *For timing diagrams, see page G-10.*
3. *All timers have multiple time ranges. For a list of ranges, see page G-13.*
4. *For socket and accessory information, see page G-11.*

Timing Diagrams

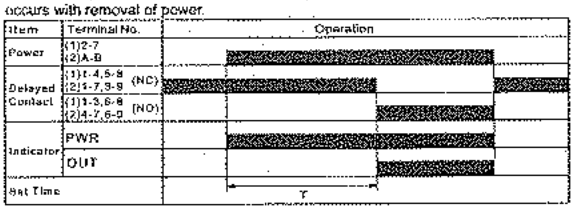


1. RTE-P2: Do not apply voltage to terminals #5, #6 & #7.
2. RTE-B1, -B2: Do not apply voltage to terminals #2, #5 & #8.
3. IDEC sockets are as follows: RTE-P1: SR2P-06 pin type socket, RTE-P2: SR3P-05* pin type socket, RTE-B1, -B2: SR3B-05* blade type socket. (*-may be followed by suffix letter A,B,C or U).*

RTE-P1, -B1

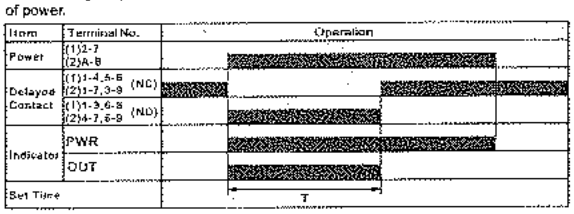
A: ON-Delay 1 (power start)

Set timer for desired delay, apply power to coil. Contacts transfer after preset time has elapsed, and remain in transferred position until timer is reset. Reset occurs with removal of power.



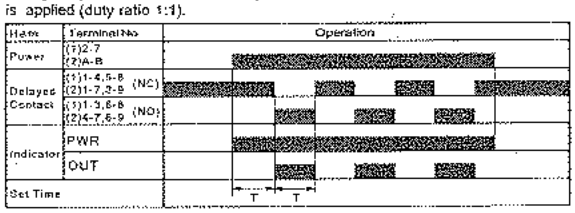
B: Interval (power start)

Set timer for desired delay, apply power to coil. Contacts transfer immediately, and return to original position after preset time has elapsed. Reset occurs with removal of power.



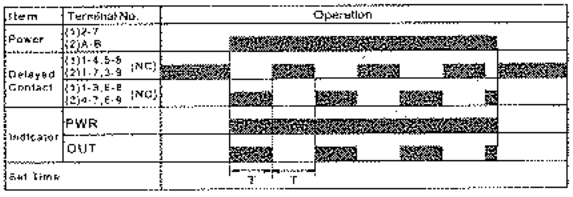
C: Cycle 1 (power start, OFF first)

Set timer for desired delay, apply power to coil. First transfer of contacts occurs after preset delay has elapsed, after the next elapse of preset delay contacts return to original position. The timer now cycles between on and off as long as power is applied (duty ratio 1:1).



D: Cycle 3 (power start, ON first)

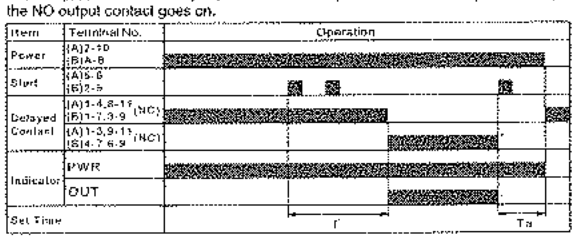
Functions in same manner as Mode C, with the exception that first transfer of contacts occurs as soon as power is applied. The ratio is 1:1. Time On = Time Off



RTE-P2, -B2

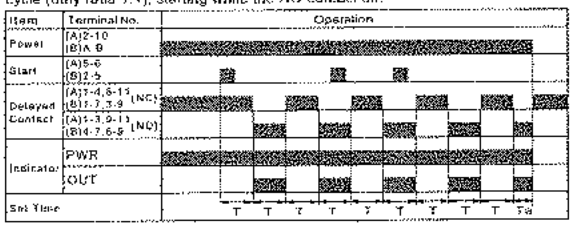
A: ON-Delay 2 (signal start)

When a preset time has elapsed after the start input turned on while power is on, the NO output contact goes on.



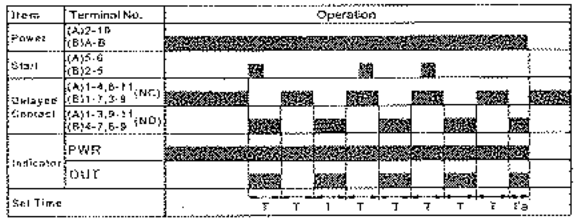
B: Cycle 2 (signal start, OFF first)

When the start input turns on while power is on, the output oscillates at a preset cycle (duty ratio 1:1), starting while the NO contact off.



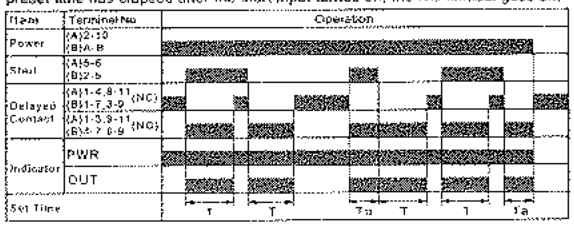
C: Cycle 4 (signal start, ON first)

When the start input turns on while power is on, the NO contact goes on. The output oscillates at a preset cycle (duty ratio 1:1).



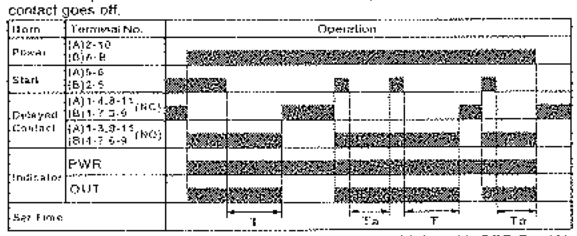
D: Signal ON/OFF-Delay

When the start input turns on while power is on, the NO output contact goes on. When a preset time has elapsed while the start input remains on, the output contact goes off. When the start input turns off, the NO contact goes on again. When a preset time has elapsed after the start input turned off, the NO contact goes off.



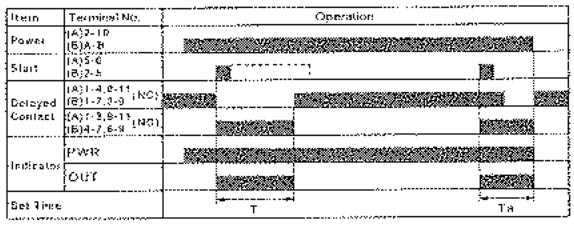
E: Signal OFF-Delay

When power is turned on while the start input is on, the NO output contact goes on. When a preset time has elapsed after the start input turned off, the NO output contact goes off.



F: One-Shot (signal start)

When the start input turns on while power is on, the NO output contact goes on. When a preset time has elapsed, the NO output contact goes off.



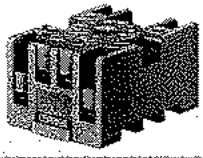
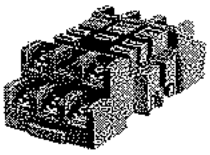
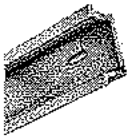
Note : T=Set Time, Ta=Shorter than set time, (1): RTE-P1, (2): RTE-B1, (A): RTE-P2, (B): RTE-B2

G

SJL

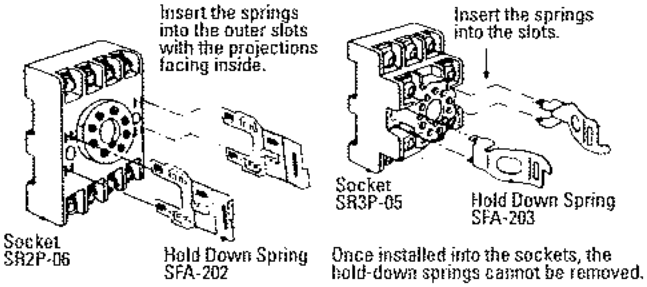
DIN Rail Mounting Accessories

Part Numbers: DIN Rail/Surface Mount Sockets and Hold-Down Springs

DIN Rail Mount Socket				Applicable Hold-Down Springs	
Style	Appearance	Use with Timers	Part No.	Appearance	Part No.
11-Pin Screw Terminal (dual tier)		RTE-P2	SR3P-05		SFA-203
11-Pin FingerSafe Socket		RTE-P2	SR3P-05C		
8-Pin Screw Terminal		RTE-P1	SR2P-06		SFA-202
11-Blade Screw Terminal		RTE-B1 RTE-B2	SR3B-05		
DIN Mounting Rail Length 1000mm		—	BNDN1000		

Installation of Hold-Down Springs

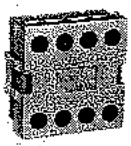
DIN Rail Mount Socket



G Timers

Panel Mounting Accessories

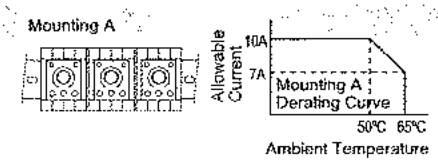
Part Numbers: Flush Panel Mount Adapter and Sockets that use an Adapter

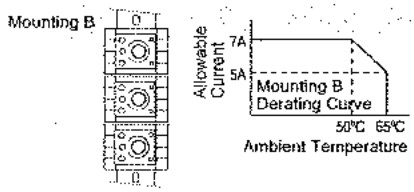
Accessory	Description	Appearance	Use with	Part No.
Panel Mount Adapter	Adaptor for flush panel mounting RTE timers		All RTE timers	RTB-G01
Sockets for use with Panel Mount Adapter	8-pin screw terminal	 (Shown: SR6P-M08G for Wiring Socket Adapter)	RTE-P1	SR6P-M08G
	11-pin screw terminal		RTE-P2	SR6P-M11G
	8-pin solder terminal		RTE-P1	SR6P-S08
	11-pin solder terminal		RTE-P2	SR6P-S11

No hold down clips are available for flush panel mounting applications.

G

Temperature Derating Curves





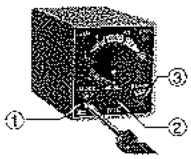
Instructions

Types

RTE-P1AF20

- Power Voltage
  - AF20: 100 to 240V AC(50/60Hz)
  - AD24: 24V AC(50/60Hz)/24V DC
  - D12: 12V DC
- Connection type
  - P: Pin
  - B: Blade
- Operation Mode
  - 1: No Control Signal
    - A: ON-Delay 1
    - B: Interval
    - C: Cycle 1
    - D: Cycle 3
  - 2: Control Signal
    - A: ON-Delay 2
    - B: Cycle 2
    - C: Cycle 4
    - D: Signal ON/OFF-Delay
    - E: Signal OFF-Delay
    - F: One-Shot

Switch Settings



① Operation Mode Selector
② Scale Selector
③ Time Range Selector

1. Turn the selectors securely using a flat screwdriver 4mm wide (maximum). Note that incorrect setting may cause malfunction. Do not turn the selectors beyond their limits.
2. Since changing the setting during timer operation may cause malfunction, turn power off before changing.

Safety Precautions

Special expertise is required to use Electronic Timers.

- All Electronic Timers are manufactured under IDEC's rigorous quality control system, but users must add a backup or fail safe provision to the control system when using the Electronic Timer in applications where heavy damage or personal injury may occur should the Electronic Timer fail.
- Install the Electronic Timer according to instructions described in this catalog.
- Make sure that the operating conditions are as described in the specifications. If you are uncertain about the specifications, contact IDEC in advance.
- In these directions, safety precautions are categorized in order of importance under Warning and Caution.

Warnings

Warning notices are used to emphasize that improper operation may cause severe personal injury or death.

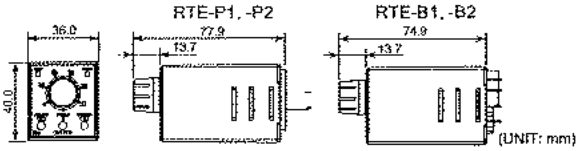
- Turn power off to the Electronic timer before starting installation, removal, wiring, maintenance, and inspection on the Electronic Timer.
- Failure to turn power off may cause electrical shocks or fire hazard.
- Do not use the Electronic Timer for an **emergency stop circuit** or **interlocking circuit.** If the Electronic Timer should fail, a machine malfunction, breakdown, or accident may occur.

Caution

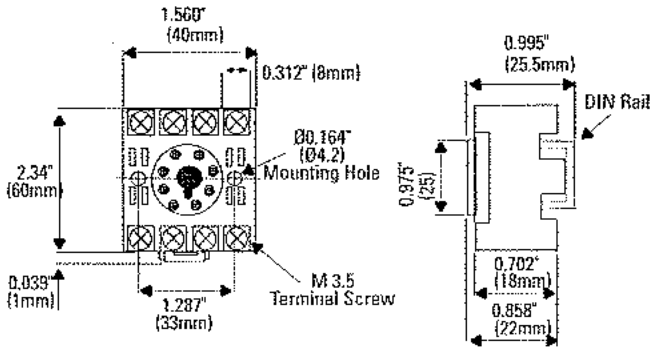
Caution notices are used where inattention might cause personal injury or damage to equipment.

- The Electronic Timer is designed for installation in equipment. Do not install the Electronic Timer outside equipment.
- Install the Electronic Timer in environments described in the specifications. If the Electronic Timer is used in places where it will be subjected to high-temperature, high-humidity, condensation, corrosive gases, excessive vibrations, or excessive shocks, then electrical shocks, fire hazard, or malfunction could result.
- Use an IEC60127-approved fuse and circuit breaker on the power and output line outside the Electronic Timer.
- Do not disassemble, repair, or modify the Electronic Timer.
- When disposing of the Electronic Timer, do so as industrial waste.

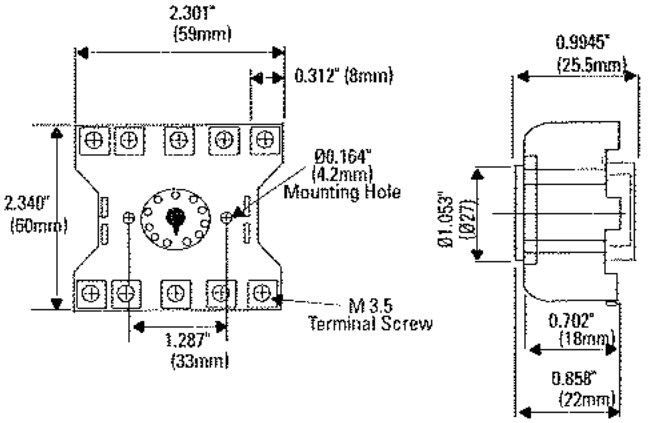
Dimensions



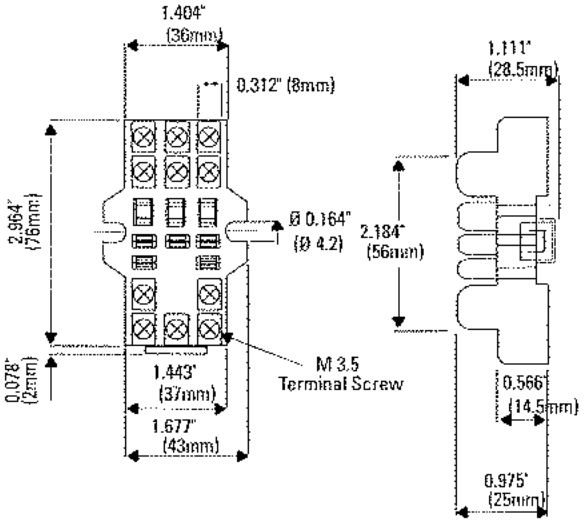
SR2P-06 Socket



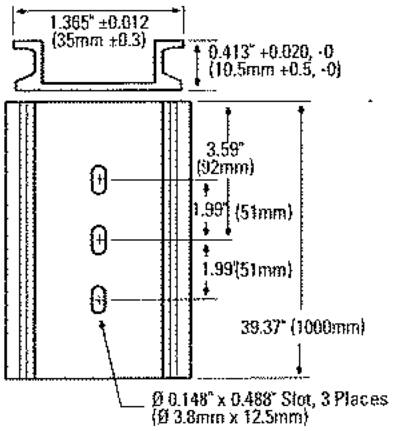
SR3P-06 Socket



SR3B-05 Socket



BNDN1000 DIN Rail

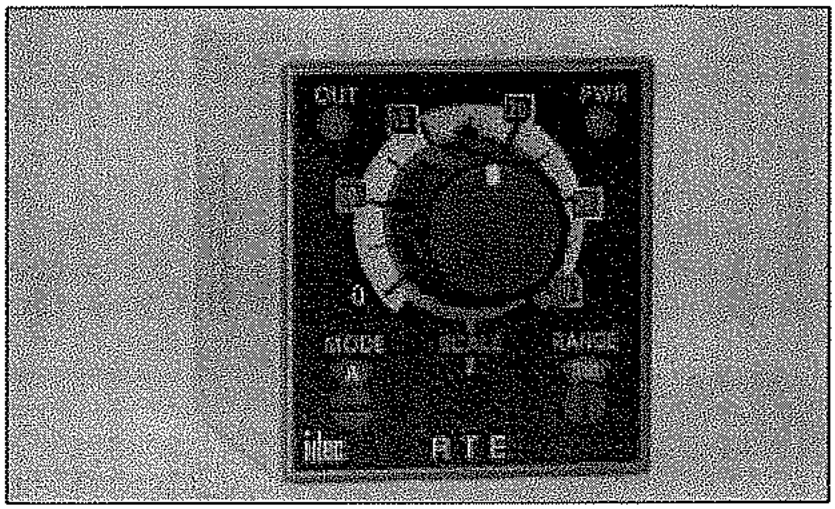


Product Upgrade

No.112 Directly from IDEC Corporation Sept. 22, 2003

***NOTE:** See reverse for replacement information on discontinued models.*

- *Changes effective immediately.*
- *No change to list prices.*
- *New part numbers (see reverse).*
- *For any questions or concerns, please call Technical Support at 1-800-262-IDEC (press 2) or email: support@idec.com.*



RTE Series – Multi-Function Timers

IDEC Corporation hereby announces a part number replacement, enhancement and consolidation for the RTE series of multi-function timers.

The new RTE timers have improved functions and are much easier to use. They now have 20 selectable time ranges from 0.1 second to 600 hours, allowing for a wide range of timing requirements. Input voltage ranges have also been expanded to provide more flexibility. The new timers are now rated for 100 to 240V AC, 24V AC/DC, or 12V DC depending upon the model.

The color of the LED lamp indicating when power is "on" has been changed from red to green and the LED light indicating when output is "on" is now orange, instead of red. The mode setting and time range setting switches, as well as the visual scale, are now rotary switches making them easier and simpler to set.

The new RTE timers are UL-listed, c-UL-listed, and CE marked.

The updated RTE timers are still available in two models (the power triggered and signal triggered), but with expanded operation modes now being offered:

Power Triggered: (Group 1)	Signal Triggered: (Group 2)
A: On Delay	A: On Delay
B: Interval	B: Cycle (off first)
C: Cycle (off first)	C: Cycle (on first)
D: Cycle (on first)	D: Signal On/OFF Delay
	E: OFF Delay
	F: One-Shot

Along with the new features, the RTE timers are available with the same tubular pin or .187" solder/quick connect plug-in terminals and can be mounted in plug-in sockets or with the optional panel mount adaptor.

On the reverse is a list of the old part numbers and their replacements.

For further information, please call IDEC Technical Support at 1-800-262-IDEC (press 2).

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RTE Series — Multi-Function Timers

New Part Number	Obsolete Part Number
RTE-B1AD24	RTE-B11-24V
	RTE-B12-24V
RTE-B1AF20	RTE-B11-AC120V
	RTE-B12-AC120V
RTE-B1D12	RTE-B11-12V
	RTE-B12-12V
RTE-B2AD24	RTE-B21-24V
	RTE-B22-24V
RTE-B2AF20	RTE-B21-AC120V
	RTE-B22-AC120V
RTE-B2D12	RTE-B21-12V
	RTE-B22-12V
RTE-P1AD24	RTE-P11-24V
	RTE-P12-24V
RTE-P1AF20	RTE-P11-AC120V
	RTE-P12-AC120V
RTE-P1D12	RTE-P11-12V
	RTE-P12-12V
RTE-P2AD24	RTE-P21-24V
	RTE-P22-24V
RTE-P2AF20	RTE-P21-AC120V
	RTE-P22-AC120V
RTE-P2D12	RTE-P21-12V
	RTE-P22-12V

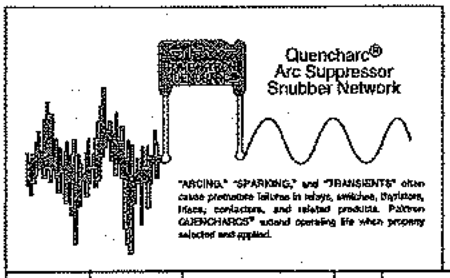
Arc Suppressor
Snubber Network

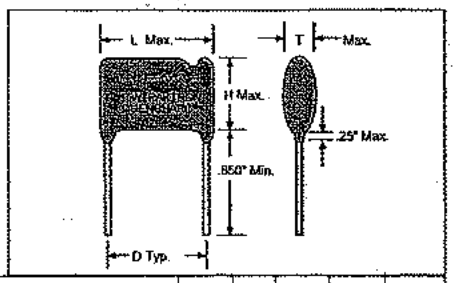
Q/QRL

UL/CSA version

QUENCHARC®

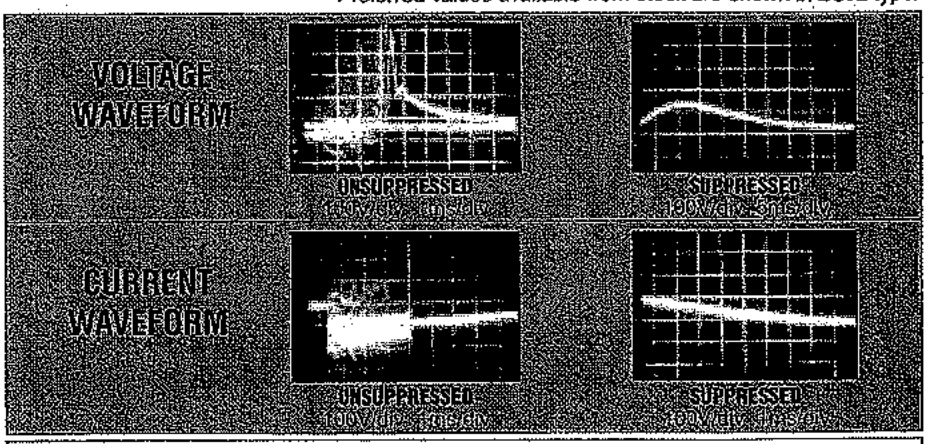
- **Relay contact protection • Noise reduction on controllers/drivers**
- **dv/dt suppression on thyristor and triacs • EMI/RFI reduction**
- **No lag time in suppression • Available voltages: 125 VAC - 660 VAC**
- **Type QRL – UL/CSA version**





PF CODE	µF ± 20%	VOLTAGE	TYPE	OHMS ±10%	WATT	T	H	L	D
104	.1	600 VDC/250 VAC	QC	**22 ,47, 100**, 150, 220, 330	1/2	.39	.66	1.08	.82
104	.1	1200 VDC/480VAC	QH	**39**	2	.64	1.04	1.60	1.29
104	.1	1600 VDC/660VAC	QV	**39**	2	.54	1.00	2.18	1.80
254	.25	600 VDC/250 VAC	QD	22, 47, 100, 150	1/2	.42	.75	1.45	1.20
504	.5	600 VDC/250 VAC	QE	22, 47, 100, 150	1/2	.59	.92	1.45	1.20
504	.5	200 VDC/125 VAC	QA	22, 47, **100, 220**	1/2	.37	.64	1.08	.82
105	1.0	200 VDC/125 VAC	QB	22, **47**	1/2	.39	.66	1.45	1.20
UL/CSA Recognized Across-the-Line Application				NOTE: Type QRL complies with UL1414/CSA-C22.2 No. 1					
104	.1	125 VAC	QRL	**150**, 680	1/2	.44	.66	1.08	.82

Preferred values available from stock are shown in **bold** type.



HOW TO ORDER

QA, QB, QC, QD, QE, QH, QV

EXAMPLE: .1 µF ± 20% 600 VDC 100 Ohms =

104	M	06	QC	100
PF CODE	**TOLERANCE**	**VOLTAGE**	**TYPE**	**RESISTOR**
	M = ± 20%	02 = 200 VDC/125 VAC	QA QD	22 150
		06 = 600 VDC/250 VAC	QB QE	39 220
		48 = 1200 VDC/480 VAC	QC QV	47 330
		66 = 1600 VDC/660 VAC	QH	100

QRL

EXAMPLE: .1 µF ± 20% 125 VAC 150 Ohms =

104	M	AC	QRL	150
PF CODE	**TOLERANCE**	**VOLTAGE**	**TYPE**	**RESISTOR**
104	M = ± 20%	AC = 125 VAC	QRL	150 680

Type QRL: UL Recognized for 125 VAC across-the-line. UL File No. E33628.
CSA Certified for 125 VAC across-the-line. CSA File No. LR32208.

ITW Paktron • P.O. Box 4539, 1205 McConville Road, Lynchburg, Virginia 24502 • Phone 804-239-6941 • FAX 804-239-4730 • www.paktron.com

HOW QUENCHARC® WORKS

The most popular and commonly used method of arc suppression is to connect a resistor-capacitor network as shown in Figures A and B. The preferred method of connection is across the contacts it wants to protect. However, the network can be hooked across the load, as is shown by the dashed line, when all inductance of the load circuit is considered lumped together.

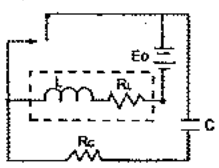


Figure A

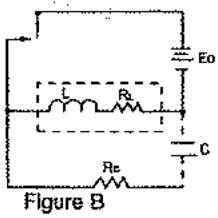


Figure B

When the contacts open, the voltage across the uncharged capacitor is zero and the transient voltage starts charging the capacitor. In the meantime, the gap of the contact is steadily widened, and by the time the capacitor is charged to its full potential, the contact gap is widened well beyond the minimum breakdown potential of air, thus preventing the arcing. When the contact closes, the inrush current from the capacitor may damage the contact, and here resistance is needed to limit the maximum current to Eo/Rc during the contact closure.

The induced voltage on opening the contact is

$$V = IRc = \frac{Rc}{RL} E_o \qquad (1)$$

and, as can be seen, the larger the value of a series resistor, the higher the induced voltage. On the other hand, the lower series resistance makes the current on contact closure higher. The time dependence of the voltage is given by:

$$V(t) = L\frac{di}{dt} + (RL + Rc)i + E_o + \frac{1}{C}\int_0^t i\,dt$$

and the rate of voltage change, which is important in transient suppression of triac switching, is:

$$\frac{dv}{dt} = L\frac{d^2i}{dt^2} + (RL + Rc)\frac{di}{dt} + \frac{i}{C}$$

Equation (3) tells us that by knowing the circuit conditions with given values of L and coil resistance that limit the current prior to contact opening, the rate of voltage rise is inversely proportional to capacitance. In other words, the larger the capacitance, the greater is the transient suppression. However, when the contact closes, the additional energy stored in the capacitor has to be discharged through the contact. Hence, a compromise has to be made in the selection of both resistance and capacitance.

In an effort to provide a simple answer to designers' requests for proper values of resistance and capacitance, some relay manufacturers came out with empirical formulas and nomographs. For instance, C.C. Bates[1] gives the equations

$$C = \frac{I^2}{10} \qquad R = \frac{E_o}{10I(1 + \frac{50}{E_o})}$$

where
C = capacitance in μF
I = load current in amperes prior to contact opening
R = resistance in ohms in series with capacitor
E_o = source voltage

The choice of resistance and capacitance value however, is quite flexible. In fact, the choice is so simple that one does not need a nomograph at all. Besides, a nomograph published by a certain relay manufacturer may be for the particular relays the firm manufactures, not necessarily universal.

[1]Bates, C.C., "Contact Protection of Electromagnetic Relays." Electro-mechanical Design, August, 1966.

CHOOSING A QUENCHARC®

In choosing a Quencharc®, first of all, check the maximum switching current rating of the contacts to be protected. This value differs for different types of contact materials and different types of relays. The maximum current during the contact closure with an RC network is E_o/R_c, where E_o is the source voltage and R_c is the resistance value of the network. The quantity E_o/R_c must be lower than the maximum switching current for obvious reasons. Next, the selection of capacitance is best done with an oscilloscope.

Connect the oscilloscope probe to the relay wiper and ground the other plate of the contact. Without an RC network across the contacts, check the amplitude of the transient voltage on contact break and the amplitude of the current on contact make. If the voltage is less than 300V and the current less than the maximum switching current rating of the relay, and if you don't see any arcing, you may not need the contact protection at all. If you spot arcing, connect a .1 μF + 100 ohm, 250 VAC, QC100 (our most widely used Quencharc®), across the contacts, and observe the levels of suppression, voltage on break and current on make. The suppressed voltage should be below 250V, which provides 70 volts of safety margin from the breakdown potential of air. If the voltage is still above 250V, try a .25 μF + 220 ohms or a .5 μF + 330 ohms range. If you need a higher capacitance than 1.0 μF, you may be better off with a Zener or a varistor in terms of cost and space. For most relays and triacs .1 μF + 100 ohms provides a satisfactory suppression.

When protecting contacts in AC circuits, the same general guidelines as for DC circuits can be used, but the wattage of the resistor must be considered if current flow is sustained for a long enough period of time to heat the component. Compute the impedance of the RC unit to obtain a current value, then use I^2R and time considerations to determine whether the standard network resistor is adequate.

OPERATING

TEMPERATURE RANGE
[illegible]

DISSIPATION FACTOR
[illegible]

DIELECTRIC WITHSTANDING VOLTAGE
[illegible]

DC LIFE TEST
[illegible]

LONG TERM STABILITY
[illegible]

PHYSICAL

TOLERANCE
[illegible]

CONSTRUCTION
[illegible]

CASE
[illegible]

WIRE LEADS
[illegible]

MARKING
[illegible]

Designation:
PLC-RSC- 12DC/21

Long description:
PLC relay, consisting of base terminal block PLC-BSC.../21 with screw connection and pluggable miniature relay with power contact, for assembly on mounting rail NS 35/7.5, 1 PDT, input voltage 12 V DC

Technical data:

Coil side:

Nominal input voltage Un:	12 V DC
Nominal input current at Un:	15.3 mA
Typical response time:	5 ms
Typical release time:	8 ms
Operating voltage display:	Yes

Protective circuit/component:
Damping diode, polarity protection diode

Contact side:

Contact type:	Single contact, 1 PDT
Contact material:	AgSnO

Maximum switching voltage:
250 V AC/DC (The separating plate PLC-ATP should be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or ...FBST 500...)

Maximum switching voltage:	250 V AC
Maximum switching voltage:	250 V DC
Minimum switching voltage:	12 V AC/DC
Minimum switching voltage:	12 V AC
Minimum switching voltage:	12 V DC
Maximum inrush current:	(on request)
Min. switching current:	10 mA
Limiting continuous current:	6 A

Power rating (ohmic load) max.:
140 W (For 24 V DC)
Power rating (ohmic load) max.: 20 W (For 48 V DC)
Power rating (ohmic load) max.: 18 W (For 60 V DC)
Power rating (ohmic load) max.:
23 W (For 110 V DC)
Power rating (ohmic load) max.:
40 W (For 220 V DC)
Power rating (ohmic load) max.:
1500 VA (for 250 V AC)

Switching capacity min.:	120 mW

General data:

Length:	80 mm
Height:	94 mm
Width:	6.2 mm
Test voltage relay winding/relay contact:	4 kV AC
Ambient temperature (operation):	-20 °C ... 60 °C
Operating mode:	100% operating factor
Service life mechanical:	2 x 10^7 cycles
Inflammability class acc. to UL 94:	V0

Standards/regulations:
IEC 60 664/IEC 60 664 A/DIN VDE 0110, contamination class 2, surge voltage category

III, DIN VDE 0106-101: 1986-11, increased isolation I/O

Standards/regulations:
DIN EN 50 178/VDE 0160/VDE 0160, IEC 60 255/DIN VDE 0435 (in relevant parts)

Standards/regulations:
IEC 60 255/DIN VDE 0435 (in relev. parts)

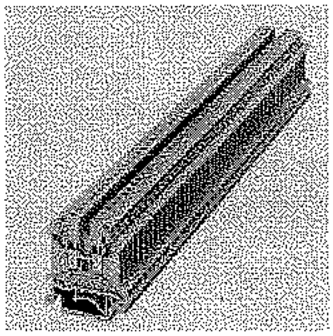
Connection data:

Type of connection:	Screw connection
Min. conductor cross section, rigid:	0.14 mm²
Conductor cross section, rigid max.:	2.5 mm²
Conductor cross section flexible min.:	0.14 mm²
Max. conductor cross section, flexible:	2.5 mm²
Min. conductor cross section AWG/kcmil:	26
Conductor cross section AWG/kcmil max:	14
Stripping length:	8 mm
Screw thread:	M 3

Order data:

Manufacturer:	Phoenix Contact
Type:	PLC-RSC- 12DC/21
Order number:	29 66 90 6

UK 5 N



Terminal width 6.2

(IEC) [mm²]	rigid solid	flexible stranded	AWG	I [A]	U [V]
IEC 947-7-1	0.2-6	0.2-4	24-10	41	800
EN 50 019 *	0.2-6	0.2-4	–	38/30	726[1)]

* Certificate no.: KEMA Ex-94.C.7133U

HCA I FELg KEMA/BV/LR/NV/RMRS/NK

Description	color	Type		Order No.	Pcs./Pkt.
Terminal block, with universal foot for mounting on [, 3 or 2	gray	**UK 5 N**		**30 04 36 2**	50
	blue	**UK 5 N BU**		**30 04 38 8**	50

Accessories

(1) **End cover**	gray	**D-UK 4/10**		**30 03 02 0**	50
	blue	**D-UK 4/10 BU**		**30 03 10 1**	50
(2) **Fixed bridge,** for cross connections in the terminal center, screw heads with insulating collar, 10-position, divisible, with 10 screws		**FBI 10-6**	I_{max}: 41 A	**02 03 25 0**	10
(3) **Insertion bridge,** fully insulated, 2-pos.		**EB 2-6**	I_{max}: 32 A	**02 01 15 5**	100
fully insulated, 3-pos.		**EB 3-6**	32 A	**02 01 14 2**	100
divisible, fully insulated, 10-pos.		**EB 10-6**	32 A	**02 01 13 9**	10
(4) **Isolator bridge bar,** 10-position, divisible, with 10 screws, for switchable branches with		**ISSBI 10-6**	I_{max}: 30 A	**03 01 50 5**	10
(5) **Bridge bar isolator** IS-K 4 as distance piece		**IS-K 4**		**13 02 33 8**	100
(6) **Switch bar for 2 terminal blocks,** complete, to increase insulation an end cover must be interposed		**USBR 2-7**	I_{max}: 34 A	**23 03 23 9**	1
(7) **Separating plate,** for electrical separation of neighboring bridges, can be inserted later, no loss of pitch		**TS-K**		**13 02 21 5**	100
(8) **Partition plate,** for visual and electrical separation of terminal groups, 1.5 mm thick		**ATP-UK**		**30 03 22 4**	50
(9) **Test plug socket,** for test connection with test plug MPS or reducing plug RPS		**PSB 3/10/4**		**06 01 29 2**	100

reducing plug RP 6

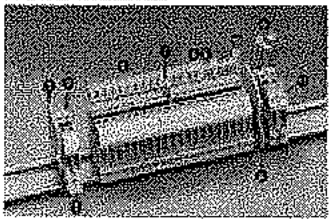
(10) **Test plug socket, insulated,** only to be used with FBI, ISSBI, for test connection with test plug MPS or RPS	**PSBJ 3/13/4**	**02 01 30 4**	100
(11) **Zack strip,** 10-section, white	**ZB 6** (see info)		
(12) **Screwdriver**	**SZS 0,6 x 3,5**	**12 05 05 3**	10

Technical data

Dimensions		
Width / length / end cover width	[mm]	6.2 / 42.5 / 1.8
Height (NS 35:7.5 / NS 35:15 / NS 32)	[mm]	47 / 54.5 / 52
Technical data in accordance with IEC/ DIN VDE		
Maximum load current / cross section	[A] / [mm^2]	41 / 6
Max. cross section with insertion bridge (solid / stranded)	[mm^2]	4 / 4
Rated surge voltage / contamination class	[kV] / –	8 / 3
Surge voltage category / insulation material group	– / –	III / I
Connection capacity		
stranded with ferrule without / with plastic sleeve	[mm^2]	0.25 - 4 / 0.25 - 2.5
Multi-conductor connection (2 conductors with same cross section)		
solid / stranded	[mm^2]	0.2 - 1.5 / 0.2 - 1.5
stranded with ferrule without plastic sleeve	[mm^2]	0.25 - 1.5
stranded with TWIN ferrule with plastic sleeve	[mm^2]	0.5 - 2.5
Stripping length	[mm]	8
Internal cylindrical gage (IEC 947-1:1988)		A 4
Thread		M 3
Torque	[Nm]	0.6 - 0.8
Insulation material		PA
Inflammability class acc. to UL 94		V0
Temperature indices RTI / Ti		130 / 120
Approval data (UL and CSA)		
Nom. voltage / nom. current / conduc. sizes	UL: [V] / [A] / AWG	600 / 30 / 30 - 10
	CSA: [V] / [A] / AWG	600 / 40 / 28 - 10

[1]) The max. nominal voltage is determined by the mounting rail, with [550 V.

Block diagram



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LOC	DIST
GZ	00

REVISIONS

P	LTR	DESCRIPTION	DATE	DWN	APVD
	A	0720-0077-05	08FEB05	WS	KH

ALL LEADS 18AWG-UNLESS OTHERWISE SPECIFIED

PRIMARY

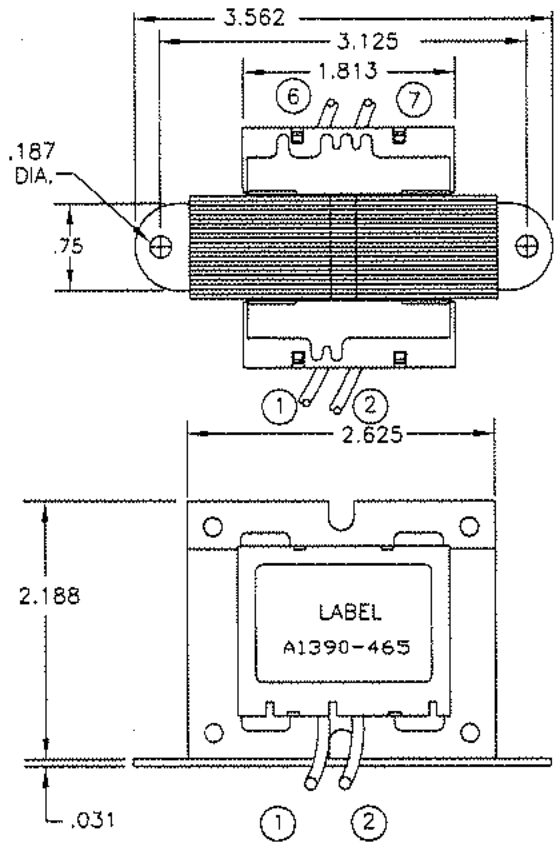
LEAD NO.	1	2	3	4	5
VOLTAGE	COM	120			
COLOR	BLK	WHT			
LENGTH	36.0	36.0			
STRIP LENGTH	.50	.50			

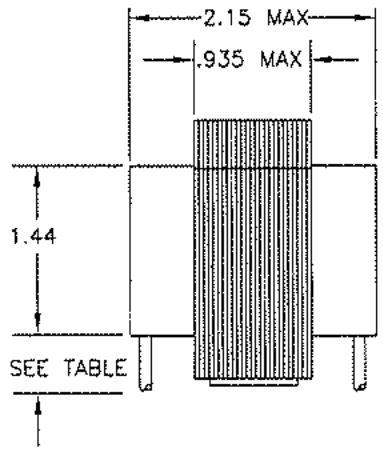
NOTES
1. DIMENSIONS FOR REFERENCE ONLY.
2. ALL LEADS +1"/-0" TOL.
3. STRIP TOL. ±1/32
4. WINDING PROTECTION- 3.0 AMP LKB FUSE IN SECONDARY NON-INHERENTLY LIMITING

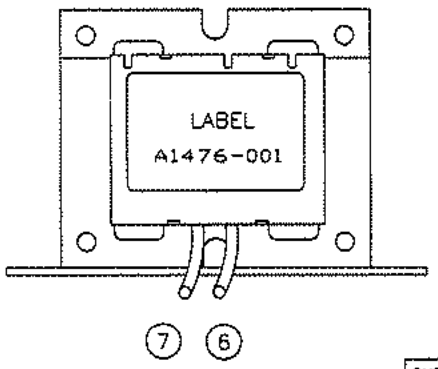
CERTIFICATION:
UL & CUL FILE NO. E87824

SECONDARY

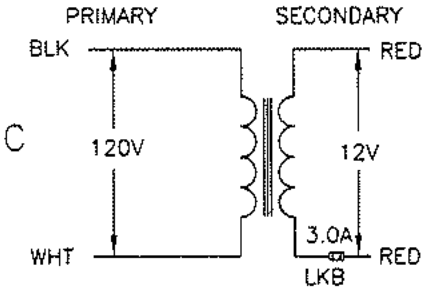
LEAD NO.	6	7	8	9
VOLTAGE	12	VAC		
COLOR	RED	RED		
LENGTH	36.0	36.0		
STRIP LENGTH	.50	.50		







SCHEMATIC



CUST. NO.	TYCO PART NUMBER
802215-01	3-1611511-3

THIS DRAWING IS A CONTROLLED DOCUMENT.

DIMENSIONS: INCHES

TOLERANCES UNLESS OTHERWISE SPECIFIED:
0 PLC ±
1 PLC ±
2 PLC ±
3 PLC ±
4 PLC ±
ANGLES ±

MATERIAL -
FINISH -

DWN W.SORAH 08FEB05
CHK K.HOLSCHUH 08FEB05
APVD K.HOLSCHUH 08FEB05
PRODUCT SPEC -
APPLICATION SPEC -
WEIGHT -

Products
Tyco Electronics Corporation
Winston-Salem NC 27101

NAME
TRANSFORMER OUTLINE
CONSOLIDATED ELECTRIC

SIZE	CAGE CODE	DRAWING NO	RESTRICTED TO
A3	00779	C-4000-20T14J507	CE

RESTRICTED CUSTOMER
SCALE NS SHEET 1 OF 1 REV A

AMP 1470-19 REV 31MAR2000

H:\EDMMOD\4000-20T14J507.dwg

Single Outlet Receptacle
EMG-30-SD/US/15A

January 2004

Features:

- DIN-Rail Mounted
- Fully Enclosed
- UL Listed: E238705
- Compact Design

Description:

This DIN-Rail mounted single outlet package was specifically designed to meet the demanding size constraints that standard dual outlet packages cannot.

At only 30mm wide, this package is ideal for locations where an outlet needs to be located in a panel while keeping exposed high voltage lines safe.

This package is fully enclosed to ensure safety from any possible contact with 120Vac. The grounding pin for the plug is also located on the top side to prevent accidental shorts from objects that could touch the live and neutral contacts.

Wiring for the outlet can be accomplished from either side of the outlet. The two sets of terminals are wired in parallel to allow the feed through of voltage for other uses.

*To learn more about other utility outlets from Phoenix Contact, visit:

http://www.phoenixcon.com/em-duo

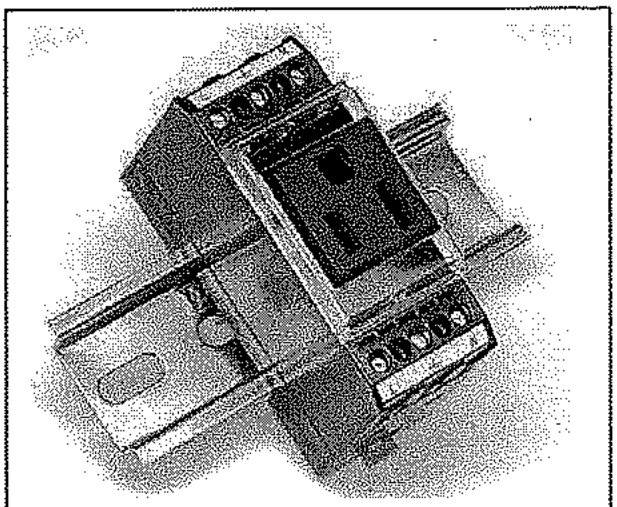


Figure 1. EMG 30-SD/US/15

General Specification

Technical Data	
Rated Voltage	120 Vac
Rated Current	15 A
Wire Size	30-12 AWG
Torque	5-7 lbs-ins
General Data	
Color	Black
Material	Polycarbonate Fiber V0 (UL 94)
Temperature Range	-20°C to +50°C (-68°F to +122°F)
Dimensions	
Height	2.95 in. (75 mm)
Width	1.18 in. (30 mm)
Depth	2.13 in. (54 mm)

Table 1. EMG 30-SD/US/15 Specifications

Phoenix Contact Inc. • P.O. Box 4100 • Harrisburg, PA 17111 • Phone: (717) 944-1300 • Fax: (717) 944-1625

EMG-30-SD/US/15A

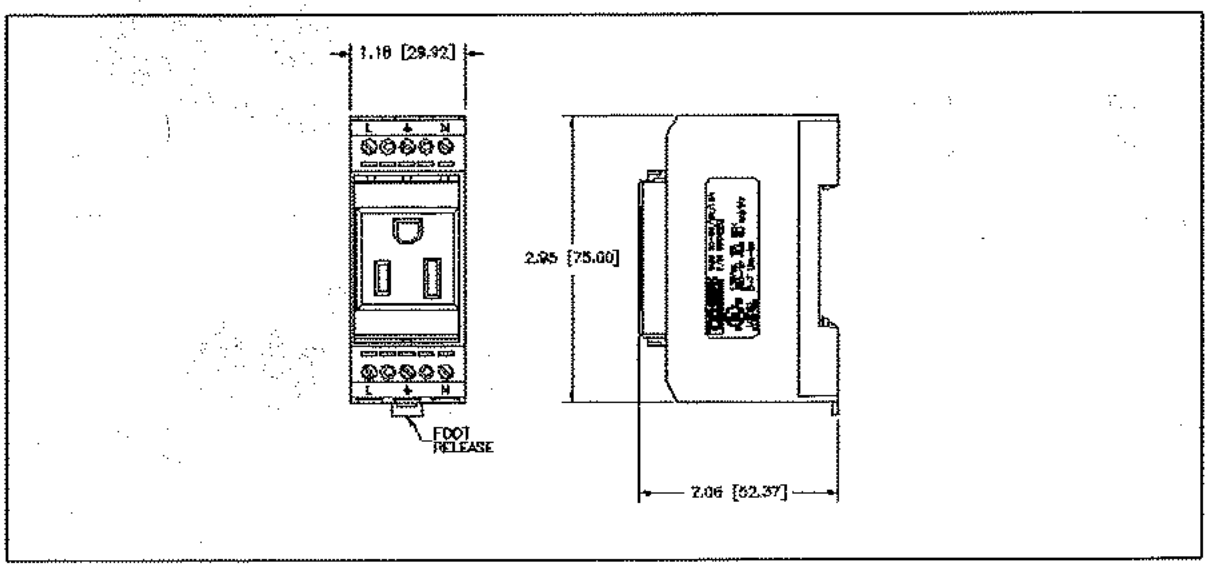


Figure 2. EMG 30-SD/US/15 Dimensions

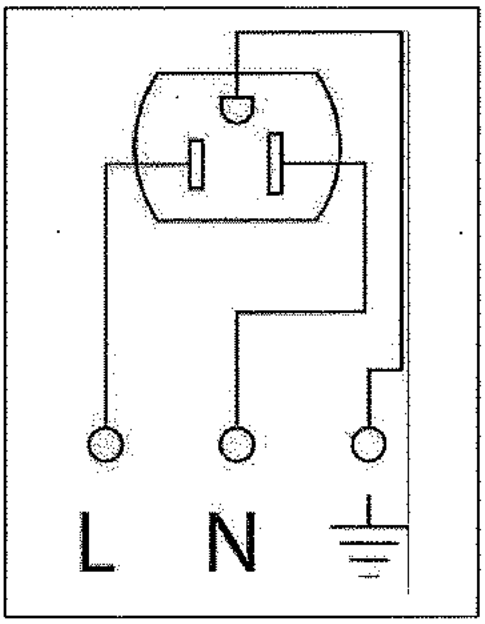


Figure 3. EMG 30-SD/US/15 Block Diagram

Ordering Information

EMG 30-SD/US/15 56 04 25 3
Single DIN-Rail Mounted Outlet

Headquarter, U.S.

Phoenix Contact Inc.
P.O. Box 4100
Harrisburg, PA 17111-0100
Technical Support and Information: (800) 322-3225
Fax: (717) 948-3475
Fax-On-Demand: (800) 944-9901
Web Site: http://www.phoenixcontact.com

Headquarter, Canada

Phoenix Contact Ltd.
235 Watline Avenue
Mississuaga, Ontario L4Z 1P3
Phone: (905) 890-2820
Fax: (905) 890-0180

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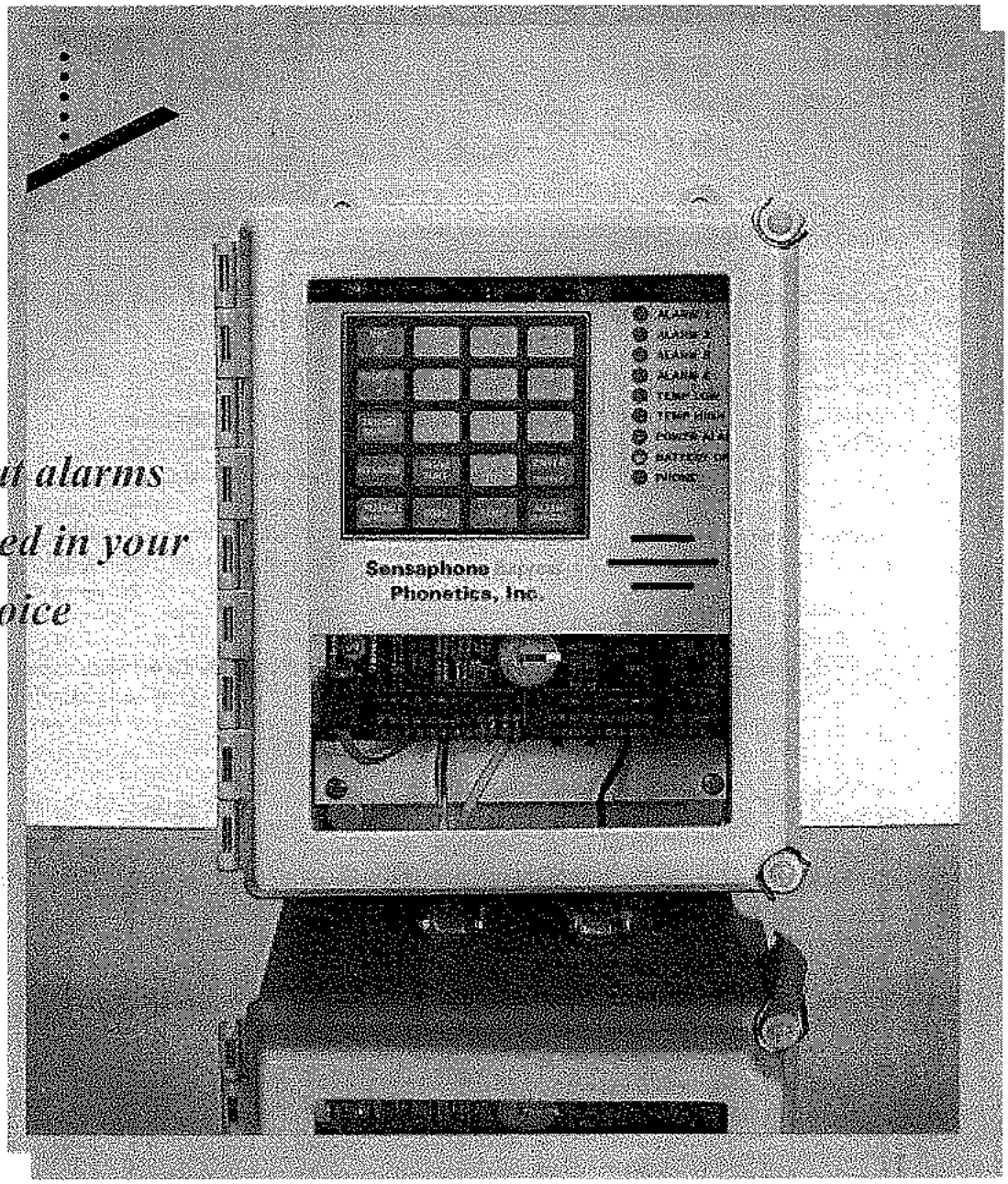
Sensaphone® Express



Dialout alarms expressed in your voice

USFCS PDF No. 1061 Rev.: 96

Phonetics, Inc.

901 Tryens Road Aston, PA 19014 Phone: (610)558-2700 FAX: (610)558-0222

Sensaphone® Express by **Phonetics, Inc.** is an advanced environmental monitoring system combined with digital speech recording technology for alarm message clarity. *Express* will warn you quickly and automatically with your own voice message when any of the monitored conditions change. *Express* is a comprehensive alarm system that is easy to use and effective to prevent disaster in your remote and unattended facilities.

SPEECH TECHNOLOGY

With *Express*, Phonetics introduces digital speech recording to its family of industrial/environmental monitors. This unique feature of *Express* allows you to record your own voice for the dial-out alarm messages. This means that when *Express* calls you during an alarm, you will receive your personalized voice message telling you exactly what the alarm condition is. Now, you can hear: "The computer room is flooding! Water level has exceeded one inch."

You can record a separate message for each of the four inputs and an ID message. You can record the voice message locally with *Express*'s built-in microphone, or remotely by telephone. The voice messages are stored in non-volatile memory so there is no loss of information if a power failure occurs.

OUTPUT

The output is a SPDT Form C contact capable of switching up to 5 Amps. The output can be automatically controlled when an alarm occurs, or you can call *Express* with a Touch-Tone™ phone and change the output manually.

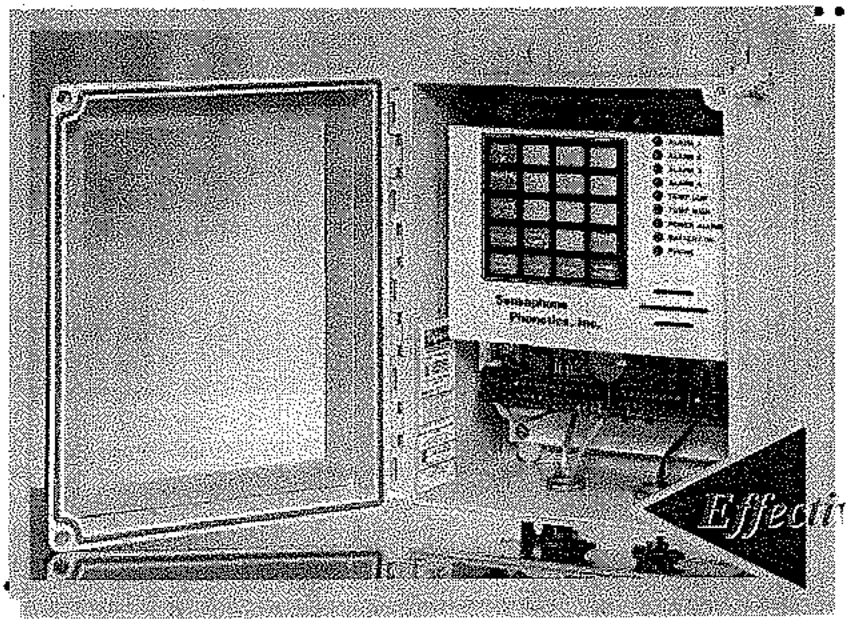
MONITORING CAPACITY

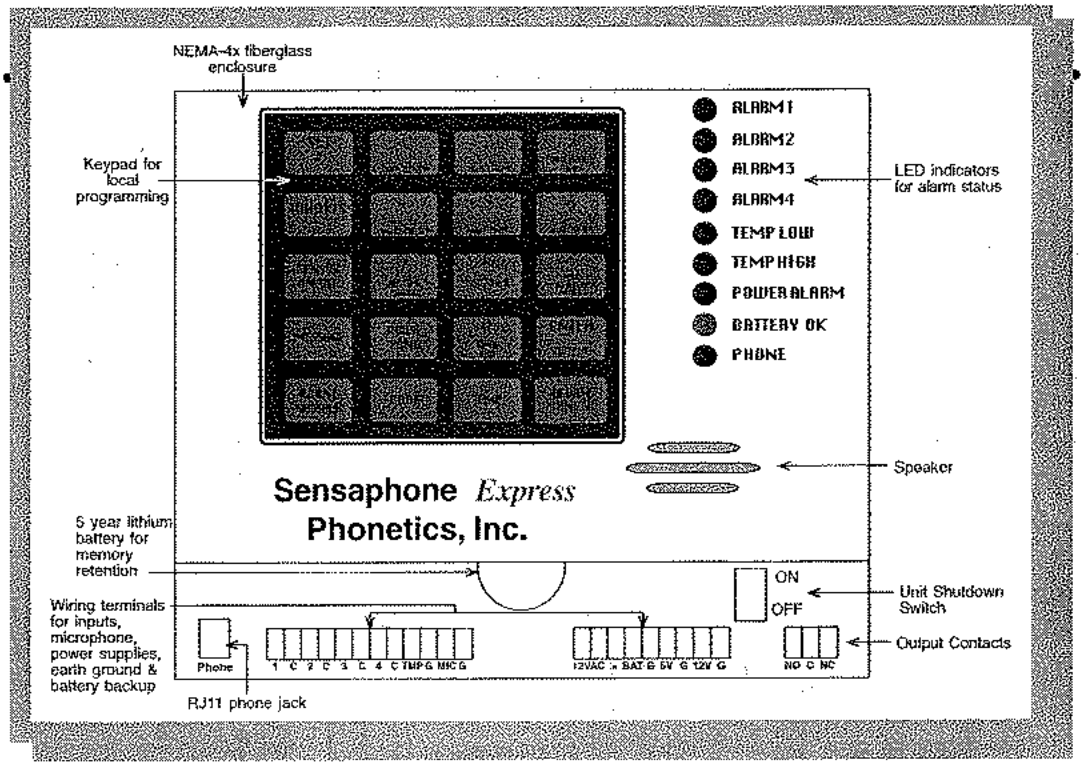
Express monitors up to four dry contacts. These can be configured as either normally open or normally closed. The alarm disabling feature allows you to enable or disable the dial-out for an input during an alarm. *Express* also monitors power failure with its built-in power out detection. Sensaphone® *Express* has a built-in temperature sensor with a 20 ft. cable to monitor in either degrees Fahrenheit or degrees Celsius. Front panel LED's indicate to on-site personnel the status of each input (ALARM/OK) for additional on-site warning. Other LED's indicate the power alarm status, battery condition, and phone status. *Express*'s built-in microphone allows you to call and listen to noises at the remote site.

RELIABILITY

Express is equipped with a 12-hour Gel Cell rechargeable backup battery to ensure continued monitoring through power failures. Microcontroller operation is insured by two watchdog circuits. Dry contact inputs are optically isolated. Non-volatile memory for voice and programming storage also prevents loss.

Express is housed in a high-impact, dust-tight NEMA 4 fiberglass enclosure. Its latched, clear cover allows you to lock the unit for security while still providing easy visual access to the front panel.





Easy access to programming, status information and wiring terminals.

FEATURES

- Digitally records user's voice for ID message and alarm messages for 4 dry contact inputs. Can be recorded locally or remotely

  Monitors 4 dry contact inputs (configured N.O./N.C.), temperature and AC power
- Stores up to 8 32-digit phone numbers
- Front panel LED's indicate input alarm status, power alarm status, low battery condition, and phone status
- 12-hour rechargeable internal battery backup with built-in charger
- Call progress detects busy signal or no answer
- Output relay for automatic or manual switching
- Housed in a dust-tight, high-impact, corrosion-resistant fiberglass NEMA 4 enclosure
- Can share a phone line with other devices
- Non-volatile memory for voice and programming storage
- Ability to call and listen to on-site sounds

PROGRAMMABILITY

Express's voice-guidance makes programming easy. Parameters such as the temperature limits, alarm recognition time, intercall delay, rings until answer, power-out to alarm time, password, message repetitions, phone numbers and voice recording can be easily programmed via the local keypad. Alarm messages can even be changed remotely. A user-defined 4-digit password prevents access to the information. Programming is stored in non-volatile memory to prevent loss of data during power failure or storage.

affordable monitoring, 24 hours a day.

ALARM NOTIFICATION

When an alarm condition occurs, *Express* automatically dials up to 8 32-digit phone numbers. *Express* recites the user-recorded ID message followed by the recorded alarm message. *Express* monitors call progress to detect busy signals or no answers. These features ensure that the right people get the alarm message without wasted time.

Alarm dial-out stops when *Express* is acknowledged. Alarms can be acknowledged by either pressing Touch-Tones™ on your phone or by calling your Express unit back.

Even when there is no alarm situation, you can keep track of your monitored conditions. You can call *Express* from any telephone to obtain a comprehensive status report on all conditions monitored by the system. *Express* also has a built-in microphone so you can listen in to sounds at the site. You can also review and change alarm messages.

APPLICATIONS

For monitoring of remote or unattended locations, Sensaphone® *Express* is ideal. Typical applications for *Express* include:

- Boilers
- Chemical Plants & Refineries
- Computer Rooms & Peripherals
- Electric Power Substations
- Frozen Food Storage
- Greenhouses
- Hatcheries, Fish & Poultry
- HVAC Systems & Equipment
- Pipelines & Compressor Stations
- Remote Pump Stations
- Security
- Switchgear & Telephone Huts
- Water & Waste Treatment Plants

SPECIFICATIONS

General:	
Monitoring Capacity:	4 dry contact inputs (configured Normally Open or Normally Closed)
	Power failure
	Temperature: -60° to 175° F or -50° to 80° C
Speech Technology:	ADPCM 24 kb/s
Message Length:	8 seconds for alarms / 10.5 seconds for ID
Message Types:	4 alarm messages / 1 ID message
Telephone Numbers:	8 phone numbers, up to 32 digits
Dialing Format:	Touch-Tone™ or pulse
Phone Connector:	RJ11C
Output Type:	SPDT Form C 5A 125 VAC
Electrical:	
Power Requirements:	120 VAC 10 Watts Max
Internal Battery Backup:	12 hour Gel Cell with built-in charger
Environmental:	
Operating Temperatures:	32° - 120° F
Operating Humidity:	0 - 90%, non-condensing
Storage Temperatures:	10° - 130° F
Physical:	
Dimensions:	10.5" x 8.5" x 6.25"
Weight:	9 lbs. 4 oz.
Enclosure:	NEMA 4
Construction:	High-impact, fiberglass with hinged, latched clear cover

© 1996 Phonetics, Inc. Sensaphone® is a registered trademark of Phonetics, Inc.
Touch-Tone™ trademark of AT&T. Specifications subject to change without notice.

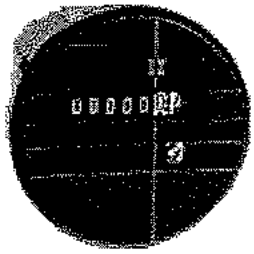
Phonetics, Inc.

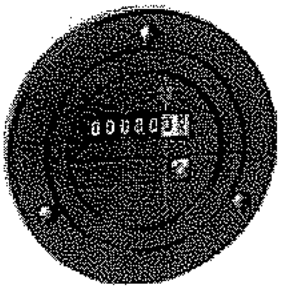
901 Tryens Road Aston, PA 19014 Phone: (610)558-2700 FAX: (610)558-0222 http://www.sensaphone.com

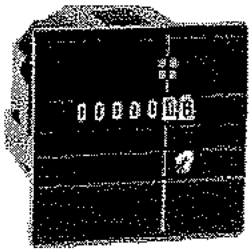
Hourmeters

Back Home Features Specifications Models Dimensions Index Next Custom Request

Model 711/731







Features

These 7 figure, AC or DC hourmeters with running indicators, offer crisp, distinctive styling for many panel applications. Available in square and round bezel, flush mount, or three-hole round panel mount. Each is light-weight, low power, and carry UL, CSA and CE approvals.

Top

Specifications

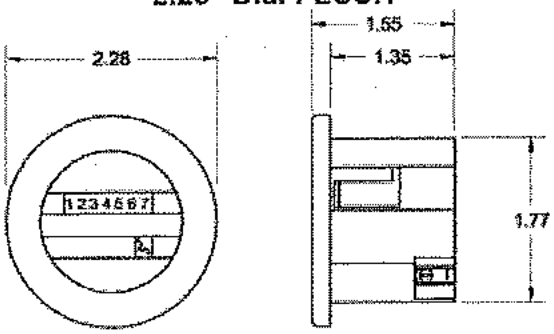
Figures	7 figures, .14" high 99,999.99 hours
Reset	Non-reset
Voltage	24, 115, or 230VAC (+/-10%), 50 or 60Hz., 10-80 V
Power	3 watts (AC), 1.2 watt maximum (DC)
Mounting	Panel (mounting hardware included)
Terminations	1/4" spade terminals, with removable screws, or 8" wire leads
Temp. Range	-22°F to +158°F
Approvals	UL Recognized and CSA Certified (AC only), CE Compliant
Weight	2 oz.
Options	Din Rail

Top

Models	Description
711-0150	115VAC/60Hz., 2.28" Dia., Flush mount, screw termination
711-0152	230VAC/60Hz., 2.28" Dia., Flush mount, screw termination
711-0160	115VAC/60Hz., 2.93" Dia., 3-hole round, screw termination
711-0161	115VAC/50Hz., 2.93" Dia., 3-hole round, screw termination

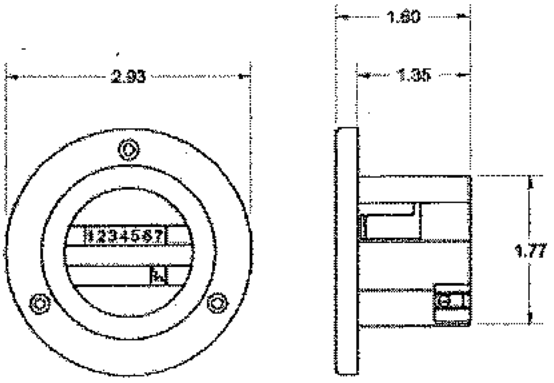
Dimensions

2.28" Dia. FLUSH



Panel cutout: 1.99" Dia. or 1.81" Sq.

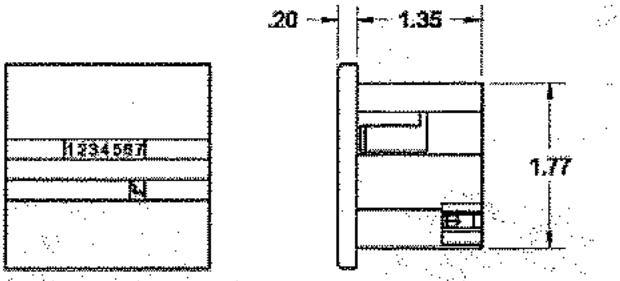
3-HOLE ROUND



Panel cutout: 1.99" Dia. or 1.81" Sq.
Screws provided: 4-40 X 5/8"
Bolt hole circle: 2.44"

1.89", 2.05", or 2.20" Sq FLUSH

711-0162	230VAC/60Hz., 2.93" Dia., 3-hole round, screw termination
711-0163	230VAC/50Hz., 2.93" Dia., 3-hole round, screw termination
711-0164	24VAC/60Hz., 2.93" Dia., 3-hole round, screw termination
711-0170	230VAC/60Hz., 2.93" Dia., 3-hole round, 8" wire leads
711-0171	115VAC/60Hz., 2.93" Dia., 3-hole round, 8" wire leads
711-0180	115VAC/60Hz., 1.89" Sq., Flush mount, screw termination
711-0182	24VAC/60Hz., 1.89" Sq., Flush mount, screw termination
711-0190	115VAC/60Hz., 2.05" Sq., Flush mount, screw termination
711-0191	230VAC/60Hz., 2.05" Sq., Flush mount, screw termination
711-0192	24VAC/60Hz., 2.05" Sq., Flush mount, screw termination
711-0193	115VAC/50Hz., 2.05" Sq., Flush mount, screw termination
711-0194	230VAC/50Hz., 2.05" Sq., Flush mount, screw termination
711-0195	24VAC/50Hz., 2.05" Sq., Flush mount, screw termination
711-0200	115VAC/60Hz., 2.20" Sq., Flush mount, screw termination
711-0201	115VAC/50Hz., 2.20" Sq., Flush mount, screw termination
731-0046	10-80VDC, 2.93" Dia., 3-hole round, screw termination



Panel cutout: 1.99" Dia. or 1.81" Sq.

Top

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18 REDINGTON COUNTERS, INC.

P.O. Box 608,130 Addison Road, Windsor CT 06095, USA
Phone (860)688-6205 Fax (860) 688-1591 Email:info@redingtoncounters.com

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Features

Four adjustment pots provide versatility for all kinds of applications.

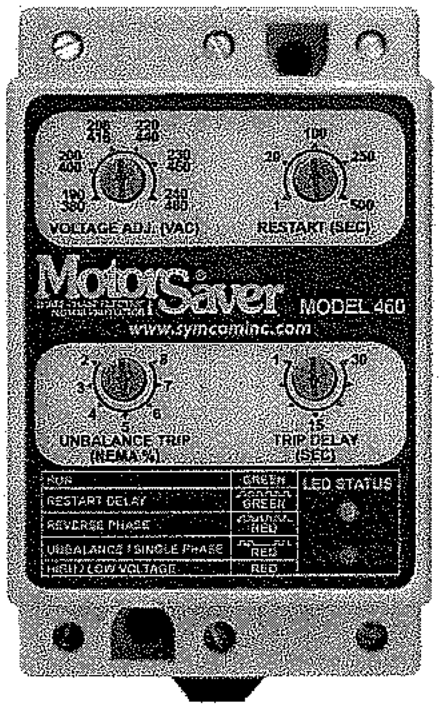
Universal range from 190-480 VAC 50/60 Hz provides the versatility needed to handle global applications.

Diagnostic LEDs indicate trip status and make trouble shooting a snap.

Microcontroller based circuitry provides better accuracy and higher reliability than analog designs.

Transient protected to meet IEEE and IEC standards to stand up under tough conditions.

Will detect single phase condition regardless of regenerated voltages.



The **Model 460** is designed to protect 3-phase loads from damaging power conditions. The 460's wide operating range combined with UL and CE compliance enables quick access to domestic and global markets.

A unique microcontroller-based voltage and phase sensing circuit constantly monitors the three phase voltages to detect harmful power line conditions. When a harmful condition is detected, the MotorSaver's output relay is deactivated after a specified trip delay. The output relay reactivates after power line conditions return to an acceptable level for a specified amount of time (Restart Delay). The trip and restart delays prevent nuisance tripping due to rapidly fluctuating power line conditions.

The Model 460 automatically senses whether it is connected to a 190 to 240V 60 Hz system, or a 440-480V 60 Hz system, or a 380 to 416V 50 Hz system. An adjustment is provided to set the nominal line voltage from 190-240 or 380-480 VAC. Other adjustments include a 1-30 second trip delay, a 1-500 second restart delay, and a voltage unbalance trip point adjustment from 2-8%.

MotorSaver
THREE-PHASE ELECTRIC MOTOR PROTECTOR

Model 460

Three Phase Voltage Monitor
•
Engineered Protection
•
Microcontroller Based

Protects 3-Phase motors from:

- Loss of any Phase
- Low Voltage
- High Voltage
- Voltage Unbalance
- Phase Reversal
- Rapid Cycling

Additional Features:

- Compact Design
- UL and cUL listed
- CE Compliant
- Finger Safe Terminals
- 5 year Warranty
- Made in USA
- Standard Surface or DIN Rail Mount
- Standard 1-500 sec. Variable Restart Delay
- Standard 2-8% Adj. Voltage Unbalance
- Standard Trip Delay 1-30 sec.
- One 10 Amp General Purpose Form C Relay

SymCom inc
Motor Protection & Controls Since 1974

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www.symcominc.com • email: sales@symcominc.com

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USFCS PDF No. 1062 Rev.: 02

MotorSaver
THREE-PHASE ELECTRIC MOTOR PROTECTOR

Specifications
•
Operating Points
•
Special Options

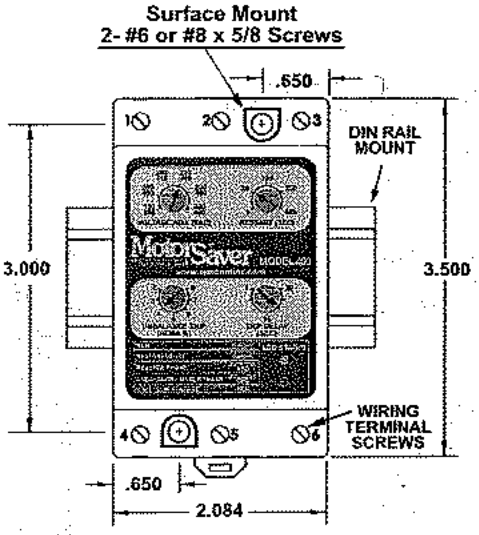
Model 460
Three Phase Voltage Monitor

Specifications

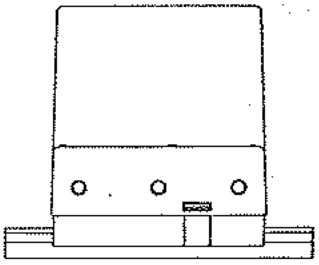
3-Phase Line Voltage	190 - 480 VAC (475 - 600 VAC Optional) (95 - 120 VAC Optional)
Frequency	50* or 60 Hz
Low Voltage (% of set point)	
•Trip	90% ±1%
•Reset	93% ±1%
High Voltage (% of set point)	
•Trip	110% ±1%
•Reset	107% ±1%
Voltage Unbalance (NEMA)	
•Trip	2 - 8% Adjustable
•Reset	Trip setting minus 1% (5 - 8%) Trip setting minus .5% (2 - 4%)
Trip Delay Time	
•Low & High Voltage and Unbalance	1 - 30 seconds adjustable
•Single Phasing Faults (>25% UB)	1 second fixed
Restart Delay Time	
•After a Fault	1 - 500 seconds adjustable
•After a Complete Power Loss	1 - 500 seconds adjustable
Output Contact Rating	
•1-Form C	10 A General Purpose @240 VAC Pilot Duty 480VA @ 240 VAC, B300
Power Consumption	6 Watts (Max.)
Weight	14 oz.
Enclosure	polycarbonate
Terminal Torque	6 in.-lbs.
Safety Marks	
•UL	UL508
•CE	IEC 60947-6-2
Standards Passed	
•Electrostatic Discharge (ESD)	IEC 1000-4-2, Level 3, 6kV contact, 8kV air
•Radio Frequency Immunity, Radiated	150 MHz, 10V/m
•Fast Transient Burst	IEC 1000-4-4, Level 3, 3.5 kV input power & controls
Surge	
•IEC	IEC 1000-4-5, Level 3, 4kV line-to-line; Level 4, 4kV line-to-ground
•ANSI/IEEE	C62.41 Surge and Ring Wave Compliance to a level of 6kV line-to-line
•Hi-potential Test	Meets UL508 (2 x rated V +1000V for 1 minute)
Environmental	
Temperature Range	Ambient Operating: -20° - 70° C (-4° - 158°F) Ambient Storage: -40° - 80° C (-40° - 176°F)
Class of Protection	IP20, NEMA 1 (FINGER SAFE)
Relative Humidity	10-95%, non-condensing per IEC 68-2-3

*Note: 50 Hz will increase all delay timers by 20%

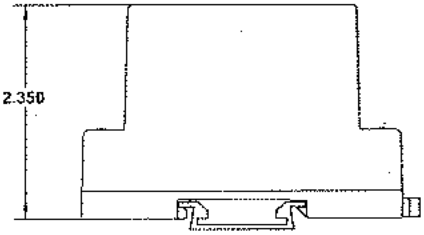
SymCom warrants its microcontroller based products against defects in material or workmanship for a period of five (5) years from the date of manufacture. All other products manufactured by SymCom shall be warranted against defects in material and workmanship for a period of two (2) years from the date of manufacture. For complete information on warranty, liability, terms, returns, and cancellations, please refer to the SymCom Terms and Conditions of Sale document.



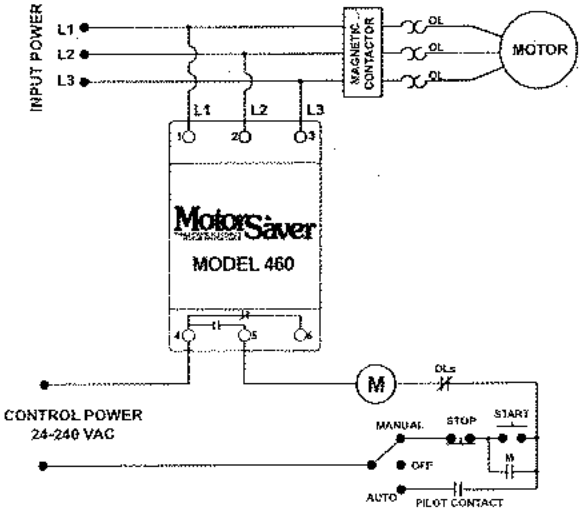
FRONT VIEW



BOTTOM VIEW



SIDE VIEW



TYPICAL WIRING DIAGRAM

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(800) 843-8848 • (605) 348-5580 • FAX (605) 348-5685
www.symcominc.com • email: sales@symcominc.com

8/02

Features

Four adjustment pots provide versatility for all kinds of applications.

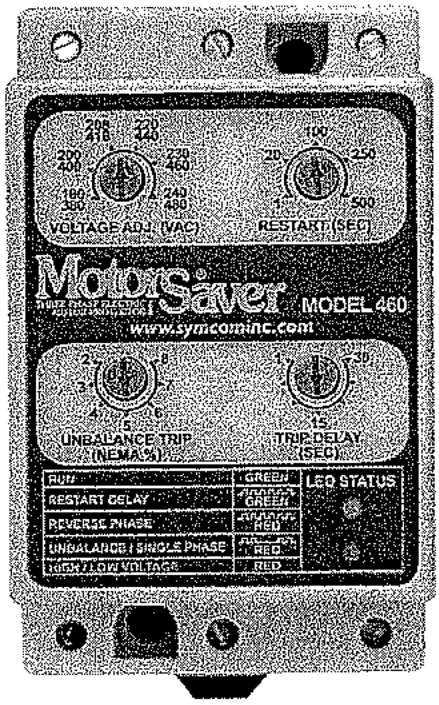
Universal range from 190-480 VAC 50/60 Hz provides the versatility needed to handle global applications.

Diagnostic LEDs indicate trip status and make trouble shooting a snap.

Microcontroller based circuitry provides better accuracy and higher reliability than analog designs.

Transient protected to meet IEEE and IEC standards to stand up under tough conditions.

Will detect single phase condition regardless of regenerated voltages.



MotorSaver

Model 460

Three Phase Voltage Monitor • Engineered Protection • Microcontroller Based

Protects 3-Phase motors from:

- Loss of any Phase
- Low Voltage
- High Voltage
- Voltage Unbalance
- Phase Reversal
- Rapid Cycling

Additional Features:

- Compact Design
- UL and cUL listed
- CE Compliant
- Finger Safe Terminals
- 5 year Warranty
- Made in USA
- Standard Surface or DIN Rail Mount
- Standard 1-500 sec. Variable Restart Delay
- Standard 2-8% Adj. Voltage Unbalance
- Standard Trip Delay 1-30 sec.
- One 10 Amp General Purpose Form C Relay

The **Model 460** is designed to protect 3-phase loads from damaging power conditions. The 460's wide operating range combined with UL and CE compliance enables quick access to domestic and global markets.

A unique microcontroller-based voltage and phase sensing circuit constantly monitors the three phase voltages to detect harmful power line conditions. When a harmful condition is detected, the MotorSaver's output relay is deactivated after a specified trip delay. The output relay reactivates after power line conditions return to an acceptable level for a specified amount of time (Restart Delay). The trip and restart delays prevent nuisance tripping due to rapidly fluctuating power line conditions.

The Model 460 automatically senses whether it is connected to a 190 to 240V 60 Hz system, or a 440-480V 60 Hz system, or a 380 to 416V 50 Hz system. An adjustment is provided to set the nominal line voltage from 190-240 or 380-480 VAC. Other adjustments include a 1-30 second trip delay, a 1-500 second restart delay, and a voltage unbalance trip point adjustment from 2-8%.

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USFCS PDF No. 1062 Rev.: 02

MotorSaver®
THREE-PHASE ELECTRIC MOTOR PROTECTOR

Specifications • Operating Points • Special Options

Model 460
Three Phase Voltage Monitor

Specifications

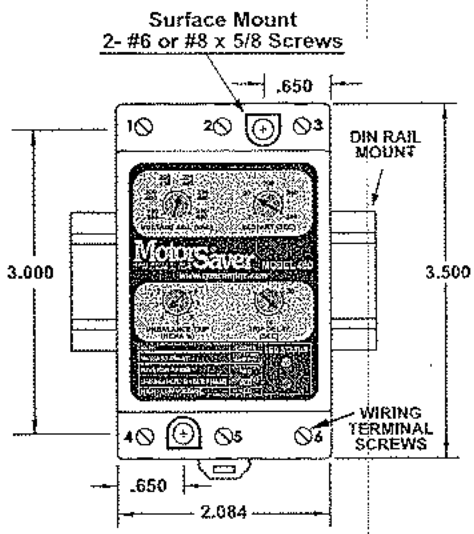
3-Phase Line Voltage	190 - 480 VAC (475 - 600 VAC Optional) (95 - 120 VAC Optional)
Frequency	50* or 60 Hz
Low Voltage (% of set point)	
•Trip	90% ±1%
•Reset	93% ±1%
High Voltage (% of set point)	
•Trip	110% ±1%
•Reset	107% ±1%
Voltage Unbalance (NEMA)	
•Trip	2 - 8% Adjustable
•Reset	Trip setting minus 1% (5 - 8%) Trip setting minus .5% (2 - 4%)
Trip Delay Time	
•Low & High Voltage and Unbalance	1 - 30 seconds adjustable
•Single Phasing Faults (>25% UB)	1 second fixed
Restart Delay Time	
•After a Fault	1 - 500 seconds adjustable
•After a Complete Power Loss	1 - 500 seconds adjustable
Output Contact Rating	
•1-Form C	10 A General Purpose @240 VAC Pilot Duty 480VA @ 240 VAC, B300
Power Consumption	6 Watts (Max.)
Weight	14 oz.
Enclosure	polycarbonate
Terminal Torque	6 in.-lbs.
Safety Marks	
•UL	UL508
•CE	IEC 60947-6-2
Standards Passed	
•Electrostatic Discharge (ESD)	IEC 1000-4-2, Level 3, 6kV contact, 8kV air
•Radio Frequency Immunity, Radiated	150 MHz, 10V/m
•Fast Transient Burst	IEC 1000-4-4, Level 3, 3.5 kV input power & controls
Surge	
•IEC	IEC 1000-4-5, Level 3, 4kV line-to-line; Level 4, 4kV line-to-ground
•ANSI/IEEE	C62.41 Surge and Ring Wave Compliance to a level of 6kV line-to-line
•Hi-potential Test	Meets UL508 (2 x rated V +1000V for 1 minute)

Environmental

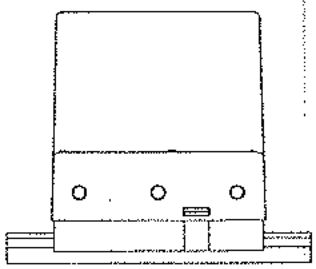
Temperature Range	Ambient Operating: -20° - 70° C (-4° - 158°F) Ambient Storage: -40° - 80° C (-40° - 176°F)
Class of Protection	IP20, NEMA 1 (FINGER SAFE)
Relative Humidity	10-95%, non-condensing per IEC 68-2-3

*Note: 50 Hz will increase all delay timers by 20%

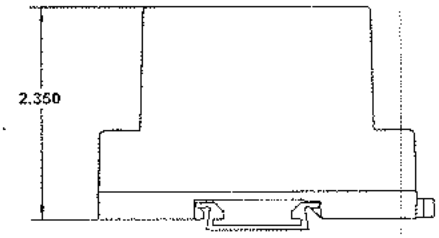
SymCom warrants its microcontroller based products against defects in material or workmanship for a period of five (5) years from the date of manufacture. All other products manufactured by SymCom shall be warranted against defects in material and workmanship for a period of two (2) years from the date of manufacture. For complete information on warranty, liability, terms, returns, and cancellations, please refer to the SymCom Terms and Conditions of Sale document.



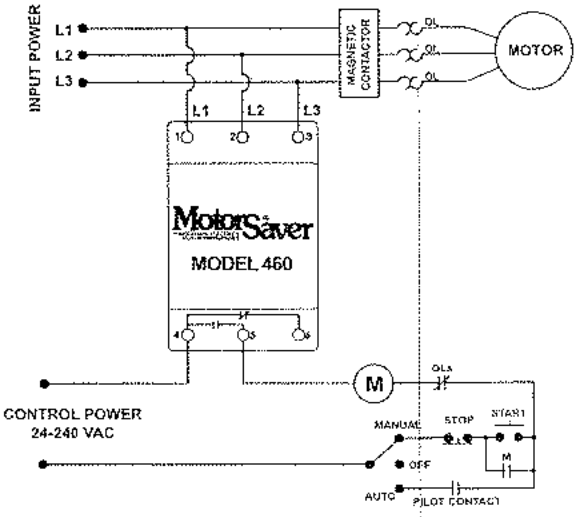
FRONT VIEW



BOTTOM VIEW



SIDE VIEW



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MotorSaver® THREE-PHASE ELECTRIC MOTOR PROTECTOR

INSTALLATION INSTRUCTIONS FOR SYMCOM'S MOTORSAVER®

MODEL 460

DANGER!

HAZARDOUS VOLTAGES MAY BE PRESENT DURING INSTALLATION.
Electrical shock can cause death or serious injury.
Installation should be done by qualified personnel following all national, state and local electrical codes.

BE SURE POWER IS DISCONNECTED PRIOR TO INSALLATION!
FOLLOW NATIONAL, STATE, AND LOCAL CODES!
READ THESE INSTRUCTIONS ENTIRELY BEFORE INSTALLATION!

! WARNING !

UNEXPECTED OUTPUT ACTUATION CAN OCCUR.
Use hard-wired safety interlocks where personnel and/or equipment hazards exist.
Failure to follow this instruction can result in death, injury or equipment damage.

The Model 460 MotorSaver® is an auto ranging voltage monitor designed to protect three-phase motors regardless of size. The MotorSaver® is used on 190-480 VAC, 50 to 60 Hz motors to protect from damage caused by single phasing, low voltage, high voltage, phase reversal, and voltage unbalance.

CONNECTIONS

1. Mount the MotorSaver® in a convenient location in or near the motor control panel. If the location is wet or dusty, the MotorSaver® should be mounted in a NEMA 4 or 12 enclosure. The MotorSaver® can be mounted to a back panel using two #6 or #8 x 5/8 screws or can be snapped onto a DIN rail.
2. Connect L1, L2 and L3 on the MotorSaver's terminal strip to the LINE SIDE of the motor starter. (See Figure No. 1).
3. Connect the output relay to the circuitry to be controlled. For motor control, connect the normally open contact in series with the magnetic coil of the motor starter as shown in Figure No. 1. For alarm operation, connect the normally closed contact in series with the control circuit as shown in Figure No. 2.

USFCS PDF No. 2354 Rev.: 08-03

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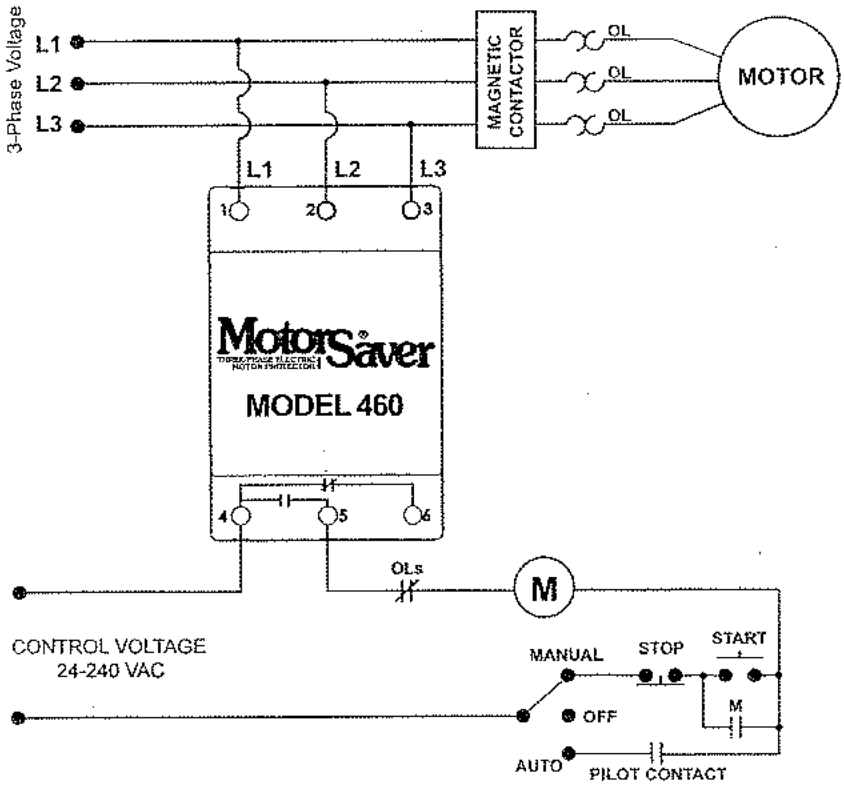


FIGURE NO. 1: CONTROL WIRING DIAGRAM

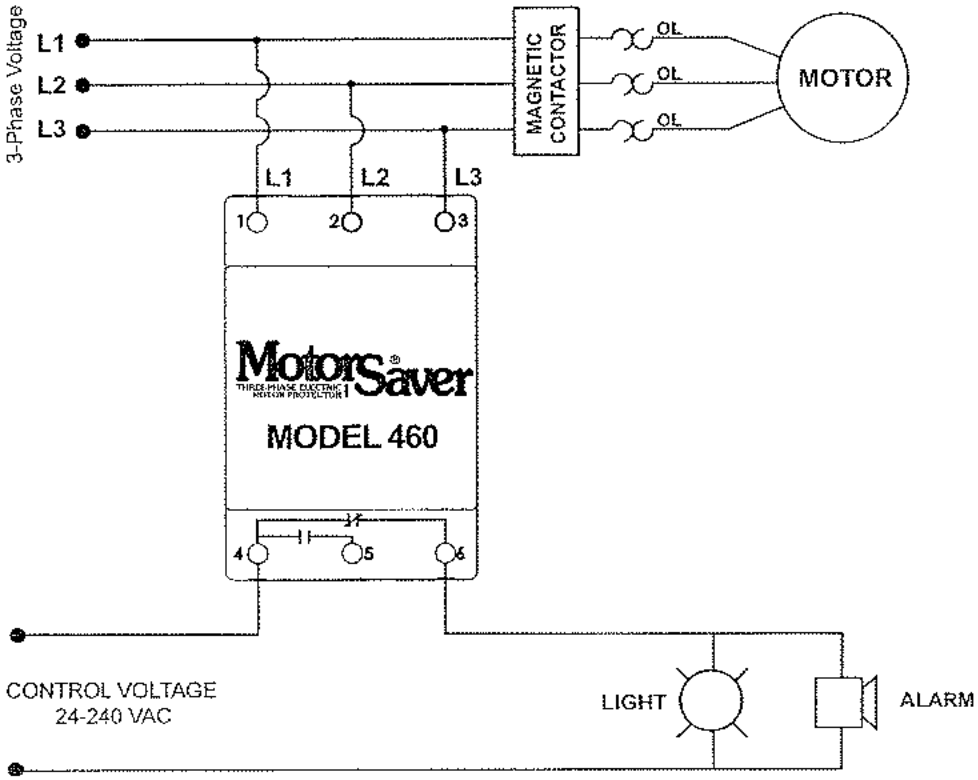
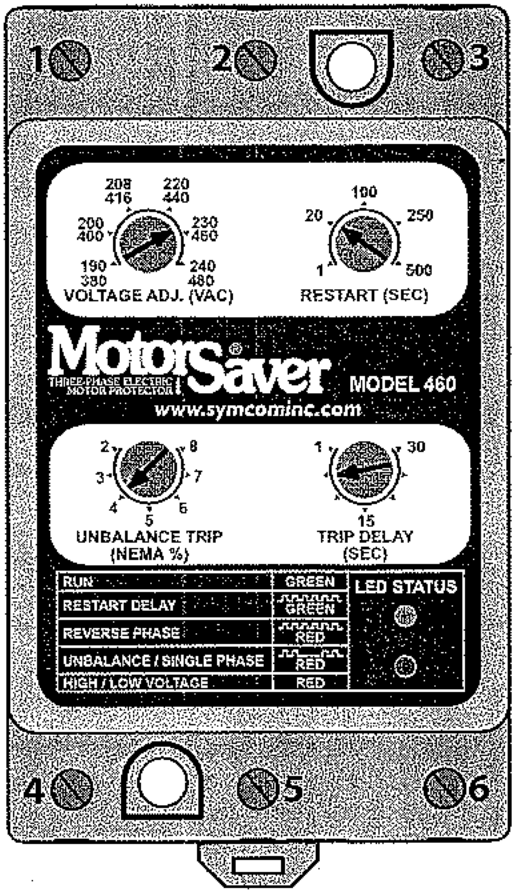


FIGURE NO. 2: ALARM WIRING DIAGRAM

SETTINGS



1. Line voltage adjustment: Rotate the **"VOLTAGE ADJ. (VAC)"** to the nominal three-phase line voltage feeding the motor to be protected.
2. Restart delay adjustment: Rotate the **"RESTART (SEC)"** adjustment to the desired position. The restart delay is the time between MotorSaver® seeing acceptable voltage and the MotorSaver® closing its output contacts. For compressor applications, the restart delay should be set for the approximate time it takes for the head pressure to bleed off of the compressor. For other applications, the restart delay is typically set between 2 and 10 seconds.
3. Trip delay adjustment: Rotate the **"TRIP DELAY (SEC)"** adjustment to the desired setting. This adjustment does not affect the trip delay on phasing faults. Typically, the trip delay adjustment is set between 1 and 5 seconds. In areas where voltage fluctuations are frequent, the trip delay adjustment may be set greater than 10 seconds.
4. Voltage unbalance adjustment: Rotate the **"UNBALANCE TRIP (NEMA%)"** adjustment to the desired unbalance trip level. The NEMA MG1 standard does not recommend operating a motor above 1% voltage unbalance without derating the motor. The NEMA MG1 standard also recommends against operating a motor above a 5% voltage unbalance under any circumstances. SymCom recommends consulting the motor manufacturer for specific tolerances.

$$\text{Percent Unbalance} = \frac{\text{Maximum Deviation from the Average}}{\text{Average}} \times 100$$

Example: The measured line-to-line voltages are 203, 210, and 212.

$$\text{Average} = \frac{203 + 210 + 212}{3} = 208.3$$

The maximum deviation from the average is the largest difference between the average voltage (208.3) and any one voltage reading.

208.3 - 203 = 5.3 210 - 208.3 = 1.7 212 - 208.3 = 3.7

The maximum deviation from the average is 5.3.

$$\frac{5.3}{208.3} \times 100 = 2.5\% \text{ Unbalance}$$

POWER-UP

Turn on the 3∅ power to the motor. The MotorSaver's green RUN light will blink during the RESTART delay. After the RESTART delay, the MotorSaver® will energize its output contacts and the green RUN light will illuminate. If the contacts do not energize and the RUN light does not illuminate, see the TROUBLESHOOTING section.

DIAGNOSTIC INDICATOR LIGHTS	
RUN	GREEN
RESTART DELAY	GREEN
REVERSE PHASE	RED
UNBALANCE / SINGLE PHASE	RED
HIGH / LOW VOLTAGE	RED

CONGRATULATIONS!!
YOU HAVE JUST INSTALLED THE FINEST MOTOR PROTECTION AVAILABLE!!

TROUBLESHOOTING

SYMPTOM	LIGHT PATTERN	SOLUTION
No lights are on. The unit seems completely dead.	N / A	Measure the three line-to-line voltages. If any of the voltages are below 150 VAC, the MotorSaver® does not have enough power to operate its internal electronics. This may occur on a single-phased system. If the voltages are correct, call SymCom at 1-800-843-8848 or 1-605-348-5580.
Red light is blinking (on initial power up).	RED	Turn off the three-phase power. Swap any two leads powering the MotorSaver® (L1, L2, or L3). There is a 50-50 chance of connecting L1, L2, and L3 correctly the first time. Re-apply the three-phase power.
Red light is blinking (after the motor has been previously running).	RED	The incoming lines have been reverse phased. The MotorSaver® is preventing the motor from running backwards. Correct the phase sequence.
Red light is blinking in this pattern.	RED	The voltage is unbalanced or single-phased. Measure the incoming line voltages and calculate the % unbalance. If the voltage unbalance does not exceed the % unbalance reset value, call SymCom at 1-800-843-8848 or 1-605-348-5580.
Red light is on steady.	RED	The voltage is out of tolerance. Measure the three line-to-line voltages. Calculate the average of the three voltages. If the average is 7% above or below the nominal voltage as selected by the LINE VOLTAGE ADJUST, the MotorSaver® is functioning properly. If the voltage is within ±7% of the selected line voltage, call SymCom at 1-800-843-8848 or 1-605-348-5580.
Green light blinks and motor is not running.	GREEN	The MotorSaver® is in restart delay.
Green light is on steady, but motor does not start.	GREEN	The MotorSaver® is in run mode. Ensure other control devices are allowing the motor to start. Check control circuit for loose wires or malfunctioning switches.

Any questions or comments call SymCom at 1-800-843-8848 or 1-605-348-5580

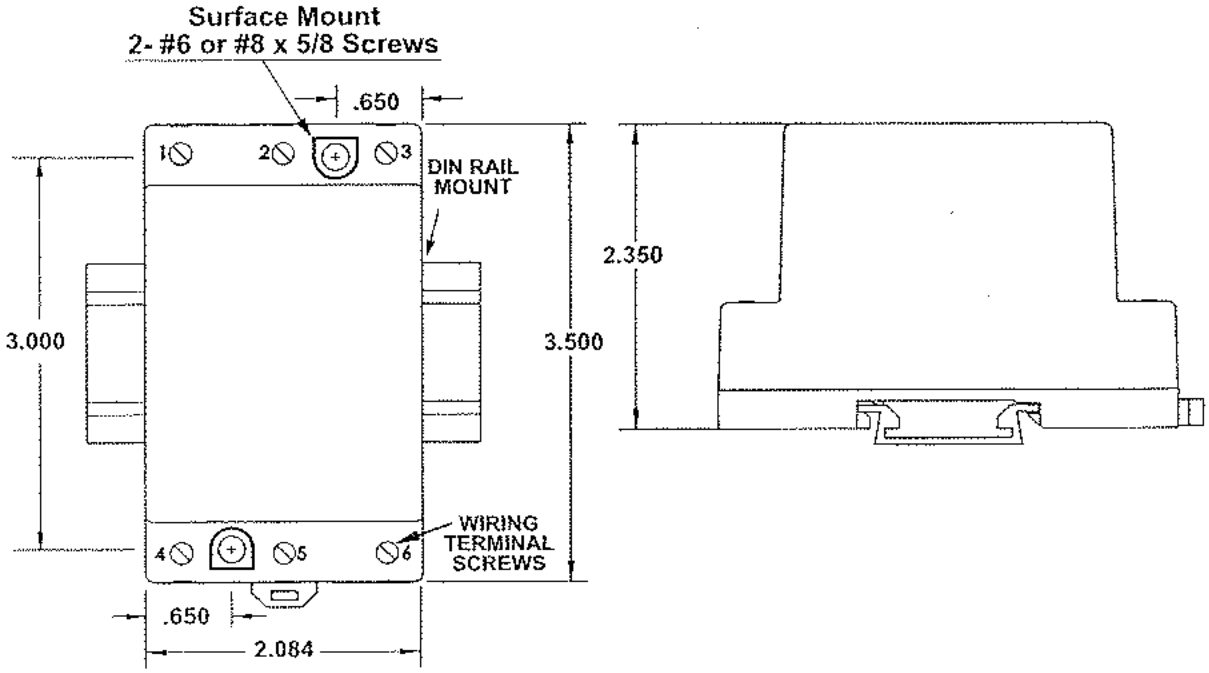
SPECIFICATIONS

3 - Phase Line Voltage	190 - 480 VAC
Frequency	50* - 60 Hz
Low Voltage (% of setpoint)	
Trip	90% ± 1%
Reset	93% ± 1%
High Voltage (% of setpoint)	
Trip	110% ±1%
Reset	107% ±1%
Voltage Unbalance (NEMA)	
Trip	2 - 8% Adjustable
Reset	Trip Setting minus 1% (5 - 8%)
	Trip Setting minus 0.5% (2 - 4%)
Trip Delay Time	
Low, High, and Unbalanced Voltage	1 - 30 Seconds Adjustable
Single-phasing faults (>25% UB)	1 Second Fixed
Restart Delay Time	
After a fault or complete power loss	1 - 500 Seconds Adjustable
Output Contact Rating - SPDT	
Pilot Duty	480 VA @ 240 VAC
General Purpose	10 A @ 240 VAC
Power Consumption	6 Watts (maximum)
Weight	14 oz
Enclosure	Polycarbonate
Terminal	
Torque	6 Inch-Pounds Max.
Wire AWG	12 - 20 AWG
Safety Marks	
UL	UL508 (File # E68520)
CE	IEC 60947-6-2
Standards Passed	
Electrostatic Discharge (ESD)	IEC 1000-4-2, Level 3, 6 kv contact, 8 kv air
Radio Frequency Immunity, Radiated	159 MHz, 10 V/m
Fast Transient Burst	IEC 1000-4-4, Level 3, 3.5 kv input power and controls

*NOTE: 50 Hz will increase all delay timers by 20%

Surge	
IEC	IEC 1000-4-5, Level 3, 4kv line-to-line; Level 4, 4kv line-to-ground
ANSI / IEEE	C62.41 Surge and Ring Wave Compliance to a level of 6kv line-to-line
Hi-potential Test	Meets UL508 (2 x rated V +1000V for 1 minute)
Environmental	
Temperature Range	Ambient Operating: -20° - 70° C (-4° - 158°F) Ambient Storage: -40° - 80° C (-40° - 176°F)
Class of Protection	IP20, NEMA 1 (Finger Safe)
Relative Humidity	10-95%, non-condensing per IEC 68-2-3

DIMENSIONS



SymCom warrants its microcontroller based products against defects in material or workmanship for a period of five (5) years* from the date of manufacture. All other products manufactured by SymCom shall be warranted against defects in material and workmanship for a period of two (2) years from the date of manufacture. For complete information on warranty, liability, terms, and conditions, please refer to the SymCom Terms and Conditions of Sale document.

Visit our website at www.symcominc.com for our complete catalog and new product listings!

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Motor Protection & Controls Since 1974

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Phone: (800) 843-8848 or (605) 348-5580
FAX: (605) 348-5685

Features

Adjustable restart delay can be set at manual position or anywhere between 2-300 seconds.

Universal range from 190-480 VAC 50/60 Hz provides the versatility needed to handle global applications.

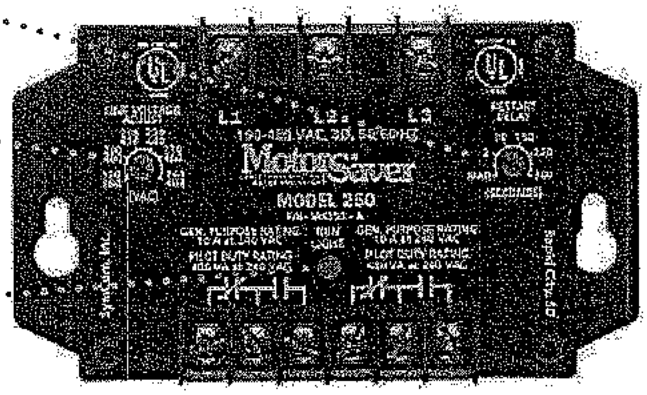
Bicolor LED indicator light is green in normal conditions and red during trip conditions.

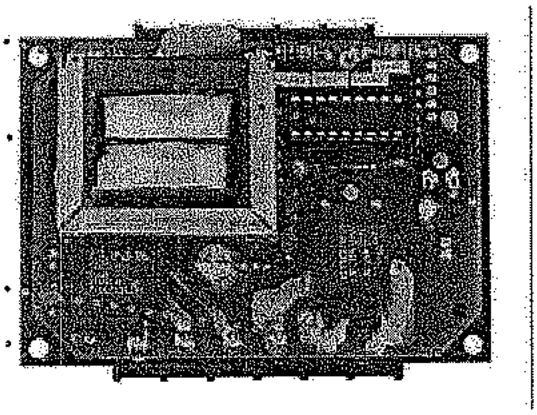
Microcontroller based provides better accuracy and higher reliability than analog designs.

Transient protected to meet IEEE 587 Standards and stand up under tougher conditions.

DPDT relay provides two 10A @ 240 VAC General Purpose Relays to switch heavier loads.

Will detect single phase condition regardless of regenerated voltages.





MotorSaver

THREE-PHASE ELECTRIC MOTOR PROTECTOR

Model 250A

Engineered Protection

Microcontroller Based

Protects 3-Phase motors from:

- Loss of any Phase (Single Phasing)
- Low Voltage
- Voltage Unbalance
- Phase Reversal
- High Voltage
- Rapid Cycling

Additional Features:

- UL and cUL listed
- 5 year Warranty
- Made in USA
- Manual - 2-300 sec. Variable Restart Delay
- Surface mount with optional Din Rail mount

Model 250A is an auto ranging voltage monitor designed to protect 3-Phase Motors regardless of size. It is used on 190-480VAC, 50 to 60 Hz motors to protect the motors from damage caused by single phasing, low voltage, phase reversal, voltage unbalance, and also high voltage. Added features include the DPDT contacts that are used to perform two functions when parameters are exceeded in addition to the standard adjustable restart delay.

A unique microprocessor-based voltage and phase sensing circuit constantly monitors the three phase voltages to detect harmful power line conditions. When a harmful condition is detected, the MotorSaver's output relay is deactivated after a specified trip delay. The output relay reactivates after power line conditions return to an acceptable level for a specified amount of time (Restart Delay). The trip and reset delays prevent nuisance tripping due to rapidly fluctuating power line conditions.

SymCom Inc.

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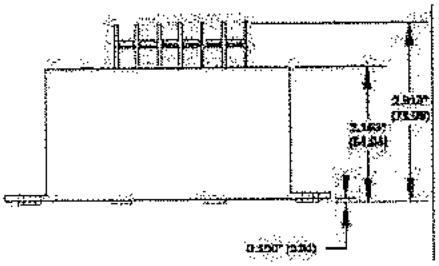
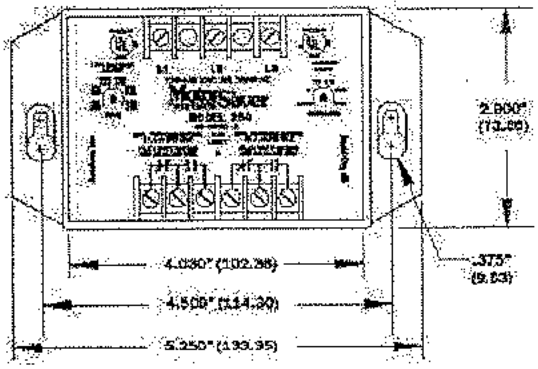
USFCS PDF No. 2307 Rev.: 06-98

MotorSaver® Model 250A

Specificatons
•
Operating Points
•
Special Options





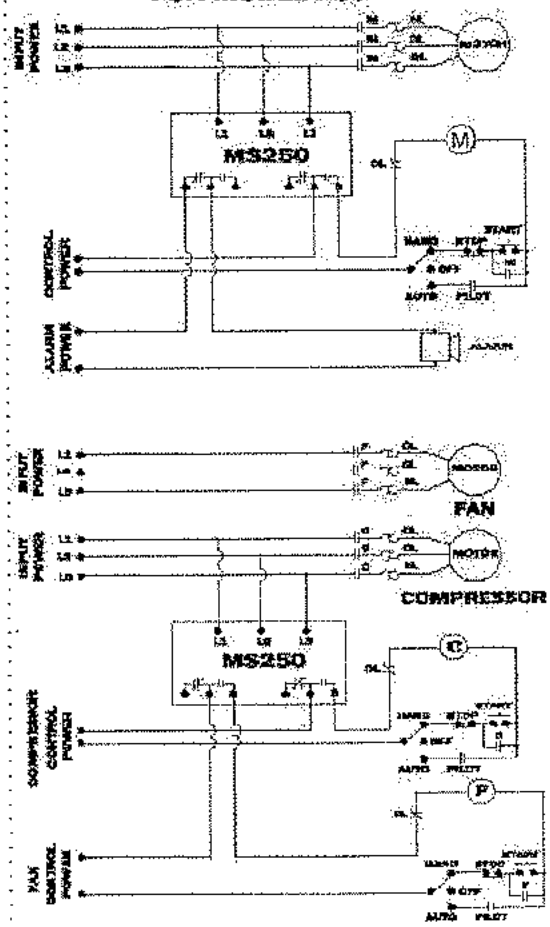
Specifications

3-Phase Line Voltage	190 to 480 VAC
Frequency	50 or 60 Hz
Low Voltage (% of set point)	
Trip	90%
Reset	93%
High Voltage (% of set point)	
Trip	10%
Reset	107%
Voltage Unbalance (NEMA)	
Trip	6%
Reset	4.5%
Trip Delay Time	
Low Voltage	4 seconds
Unbalance & Phasing Faults	2 seconds
Restart Delay Time	
After a Fault	2 - 300 seconds
After a Complete Power Loss	2 - 300 seconds
Output Contact Rating (Pilot Duty)	
DPDT	480 VA @ 240 VAC
	or 10A @240 VAC
	Gen. Purpose
Transient Protection (Internal)	2500 V for 10 mSeconds
Power Consumption	5 Watts (Max.)
Weight	4 oz.

*Note: 50 Hz will increase all delay timers by 20%.

SymCom warrants its microprocessor based products against defects in material or workmanship for a period of five (5) years from the date of manufacture. All other products manufactured by SymCom shall be warranted against defects in material and workmanship for a period of two (2) years from the date of manufacture. For complete information on warranty, liability, terms, returns, and cancellations, please refer to the SymCom Terms and Conditions of Sale document.

TYPICAL WIRING DIAGRAM FOR MODEL 250



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Dry Type 600 Volts and Below

Single Phase
Class 7400

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Single Phase—General Purpose Transformers

General purpose standard transformers are intended for power, heating, lighting, and light-duty control applications. Contact your nearest Square D/Schneider Electric sales office for voltages not listed below.

kVA	Catalog Number▲	Price	Full Capacity Taps	Degree C Temp. Rise	Weight♦ (Pounds)	Enclosure ■ ♦
Single Phase—240 X 480 V Primary 120/240 V Secondary 60 Hz cULus Listed through 167 kVA						
.050	50SV1A		None	55	4.2	1A
.100	100SV1A		None	55	4.5	2A
.150	150SV1A		None	55	6.2	3A
.250	250SV1B		None	80	10.5	4A
.500	500SV1B		None	80	13.8	5A
.750	750SV1F		None	115	15.5	6A
1	1S1F		None	115	21.2	7A
1.5	3S1F		None	115	30.1	8A
2	2S1F		None	115	39.1	9A
3	3S1F		None	115	60	10A
5	5S1F		None	115	115	13B
7.5	7S1F		None	115	135	13B
10	10S1F		None	115	165	13B
15	15S1F		None	115	225	15B
15	15S1H		None	150	200	17D
25	25S3H		6–2.5%2+4–★	150	245	17D
37.5	37S3H		6–2.5%2+4–★	150	325	18D
50	50S3H		6–2.5%2+4–★	150	350	18D
75	75S3H		6–2.5%2+4–★	150	450	21D
100	100S3H		6–2.5%2+4–★	150	640	22D
167	167S3H		6–2.5%2+4–★	150	975	24D
200	200S3H		6–2.5%2+4–★	150	1220	25D
250	250S3H		6–2.5%2+4–★	150	1535	26D
Single Phase—480 V Primary 120/240 V Secondary 60 Hz UL/cULus Listed through 25 kVA						
3	3S40F		2–5%FCBN	115	60	10A
5	5S40F		2–5%FCBN	115	115	13B
7.5	7S40F		2–5%FCBN	115	135	13B
10	10S40F		2–5%FCBN	115	165	13B
15	15S40F		2–5%FCBN	115	225	15B
15	15S40H		2–5%FCBN	150	200	17D
25	25S40F		2–5%FCBN	115	300	19B
Single Phase—600 V Primary 120/240 V Secondary 60 Hz cULus Listed through 167 kVA						
.050	50SV51A		None	55	4.2	1A
.100	100SV51A		None	55	4.5	2A
.150	150SV51A		None	55	6.2	3A
.250	250SV51B		None	80	10.5	4A
.500	500SV51B		None	80	13.8	5A
.750	750SV51F		None	115	15.5	6A
1	1S51F		None	115	21.2	7A
1.5	1.5S51F		None	115	30.1	8A
2	2S51F		None	115	39.1	9A
3	3S4F		2–5%FCBN	115	60	10A
5	5S4F		2–5%FCBN	115	115	13B
7.5	7S4F		2–5%FCBN	115	135	13B
10	10S4F		2–5%FCBN	115	165	13B
15	15S5H		4–2.5%FCBN	150	200	17D
25	25S5H		4–2.5%FCBN	150	245	17D
37.5	37S5H		4–2.5%FCBN	150	325	18D
50	50S5H		4–2.5%FCBN	150	350	18D
75	75S5H		4–2.5%FCBN	150	450	21D
100	100S5H		4–2.5%FCBN	150	640	22D
167	167S5H		4–2.5%FCBN	150	975	24D

▲ Catalog Numbers shown in bold type are available from Distribution Center.
■ For enclosure styles, see Dimensions Table, page 12-10.
♦ Not for construction. Contact your nearest Square D/Schneider Electric sales office for certified prints.
★ When 240 volt connection is used, there will be 3–5% taps, 1 above and 2 below 240 volts.
FCBN: Full capacity below normal
Lugs: Furnished by customer

Single Phase—Shielded and Non-shielded

cULus Listed through 167 kVA

kVA	Catalog Number		Degree C Temp. Rise	Weight (Pounds)♦	Enclosure■ ♦
1	1S( )F		115	21.2	7A
1	1S( )FIS		115	21.2	7A
1.5	1.5S( )F		115	30.1	8A
1.5	1.5S( )FIS		115	30.1	8A
2	2S( )F		115	39.1	9A
2	2S( )FIS		115	39.1	9A
3	3S( )F		115	60	10A
3	3S( )FIS		115	60	10A
5	5S( )F		115	110	13B
5	5S( )FIS		115	110	13B
7.5	7S( )F		115	135	13B
7.5	7S( )FIS		115	135	13B
10	10S( )F		115	150	13B
10	10S( )FIS		115	150	13B
15	15S( )H		150	205	17D
15	15S( )HIS		150	205	17D
25	25S( )H		150	240	17D
25	25S( )HIS		150	240	17D
37.5	37S( )H		150	325	18D
37.5	37S( )HIS		150	325	18D
50	50S( )H		150	350	18D
50	50S( )HIS		150	350	18D

To Complete Catalog Number:

1. Select the voltage required from chart 1.
2. Insert the voltage code number in place of the ( ) in the catalog number.

Chart 1

Voltage Code	Primary	Secondary	Full Capacity Taps
6	120x240	120/240	None
7	208	120/240	None
60◊	208	120/240	2–5% FCBN
9	208	208	None
1292	208	277	None
8	277	120/240	None
61◊	277	120/240	2–5% FCBN
3◊	240x480	120/240	6–2.5% 2+4-
72	480	208	None
78	480	277	None

▲ Catalog Numbers shown in bold type are available from Distribution Center.
■ For enclosure styles, see Dimensions Table, page 12-10.
♦ Not for construction. Contact your nearest Square D/Schneider Electric sales office for certified prints.
◊ Taps are available on transformers 10 kVA and larger.
FCBN: Full capacity below normal
Lugs: Furnished by customer

Single Phase—Export Model Transformers

These general-purpose transformers are designed to accommodate voltage systems worldwide.

Export model transformers 10 kVA and smaller, certified by TUV (file no. E9571881.01) to meet EN61558-1, are CE marked in addition to being UL and cULus Listed.

For CE marked transformers in other ratings, contact your nearest Square D/Schneider Electric sales office for CE marked transformers up to 300 kVA, single and three phase.

See page 12-11 for optional FINGERSAFE® terminal block cover kit.

Single Phase—190/200/208/220 X 380/400/416/440 V Primary, 110/220 V Secondary 50/60 Hz
UL Listed through 25 kVA, CE marked/cULus Listed through 10 kVA, cULus Listed through 25 kVA

kVA	Catalog Number▲		Full Capacity Taps	Deg. C Temp. Rise	Weight ♦ (Pounds)	Enclosure ■ ♦
1▼	1S67F		None	115	21.2	7A
2	2S67F		None	115	39.1	9A
3	3S67F		None	115	55.2	10A
5	5S67F		None	115	135	13B
7.5	7S67F		None	115	165	13B
10	10S67F		None	115	165	13B
15	15S67H		None	150	225	17D
25	25S67H		None	150	260	17D

▼ 0.750 kVA EN rating per EN 61558-1
1–10 kVA CE marked per EN 61558-1

For additional information, reference Catalog #7400CT9601.

USFCS PDF No. 633 Rev.: 10-3

PE2 | Discount Schedule

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9/8/03

Dry Type 600 Volts and Below
Enclosures
Class 7400

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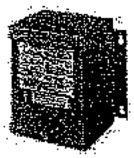
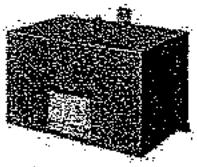
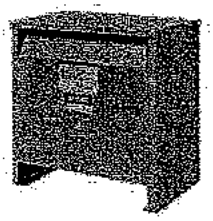


Style A–NEMA Type 3R Rated

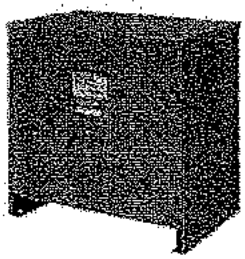
Style B–
NEMA Type 3R Rated



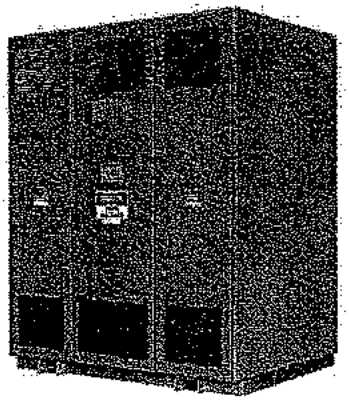
Style C–NEMA Type 3R Rated



Style D–NEMA Type 2 Rated
Converts to NEMA Type 3R with Weathershield



Style E–IP55 Rated



Style F–NEMA Type 1 Rated

Table 1: Enclosure Dimensions and Accessories (Note 1)

Enclosure Number/ Style		Height		Width		Depth		Mtg.	Weathershield	Wall Mounting Bracket	Ceiling Mounting Bracket	Insulation Class °C
		IN	mm	IN	mm	IN	mm					
1	A	5	127	4.47	114	3.44	87	Wall	Note 2	Note 3	—	105
2	A	5.5	140	4.47	114	3.44	87	Wall	Note 2	Note 3	—	105
3	A	5	127	4.85	123	3.75	95	Wall	Note 2	Note 3	—	105
4	A	5.5	140	5.23	133	4.06	103	Wall	Note 2	Note 3	—	130
5	A	6.19	157	6.19	157	4.69	119	Wall	Note 2	Note 3	—	130
6	A	6.69	170	6.19	157	4.69	119	Wall	Note 2	Note 3	—	180
7	A	8.13	270	6.94	176	5.31	135	Wall	Note 2	Note 3	—	180
8	A	8.25	210	8.69	220	6.56	167	Wall	Note 2	Note 3	—	180
9	A	9.56	243	8.69	220	6.56	167	Wall	Note 2	Note 3	—	180
10	A	10.5	267	8.62	219	6.5	165	Wall	Note 2	Note 3	—	180
11	A	12.56	319	8.62	219	6.5	165	Wall	Note 2	Note 3	—	180
12	C	13.5	343	14.75	375	9	229	Wall	Note 2	Note 3	—	180
13	B	14.75	375	9.75	248	11.75	298	Wall	Note 2	Note 3	—	180
14	C	14.75	375	19.1	485	12.25	311	Wall	Note 2	Note 3	—	180
15	B	20	508	15	381	13.5	343	Wall	Note 2	Note 3	—	180
16	C	22	559	25	635	13.5	343	Wall	Note 2	Note 3	—	180
17	D	27	686	20	508	16	406	Floor	WS363	WMB361–362	CMB363	220
	E	27	686	20	508	16	406	Floor	Note 5	WMB361–362	CMB363	220
18	D	30	762	20	508	20	508	Floor	WS363	WMB363–364	CMB363	220
	E	30	762	20	508	20	508	Floor	Note 5	WMB363–364	CMB363	220
19	D	30	762	30	762	20	508	Floor	WS364	WMB363–364	CMB364	220
	E	30	762	30	762	20	508	Floor	Note 5	WMB363–364	CMB364	220
20	D	37	940	30	762	20	508	Floor	WS364	WMB363–364	CMB364	220
	E	37	940	30	762	20	508	Floor	Note 5	WMB363–364	CMB364	220
21	D	37	940	30	762	24	610	Floor	WS364	N/A	CMB364	220
	E	37	940	30	762	24	610	Floor	Note 5	N/A	CMB364	220
22	D	43.75	1111	32	813	27	686	Floor	WS380	N/A	CMB380	220
	E	43.75	1111	32	813	27	686	Floor	Note 5	N/A	CMB380	220
23	E	48	1219	48	1219	29.5	749	Floor	Note 5	N/A	N/A	220
24	D	49.5	1257	35	889	28.5	724	Floor	WS381	N/A	CMB381	220
	E	49.5	1257	35	889	28.5	724	Floor	Note 5	N/A	CMB381	220
25	D	49.5	1257	41	1041	32	813	Floor	WS382	N/A	N/A	220
	E	49.5	1257	41	1041	32	813	Floor	Note 5	N/A	N/A	220
26	D	57.5	1461	41	1041	32	813	Floor	WS382	N/A	N/A	220
28	D	60	1524	56	1422	36	914	Floor	WS370A	N/A	N/A	220
	E	60	1524	56	1422	36	914	Floor	Note 5	N/A	N/A	220
29	D	68	1727	56	1422	36	914	Floor	WS370A	N/A	N/A	220
30	D	71	1803	48	1219	36	914	Floor	WS383	N/A	N/A	220
31	D	74	1880	56	1422	40.5	1029	Floor	WS384	N/A	N/A	220
31	E	60	1524	56	1422	36	914	Floor	Note 5	N/A	N/A	220
32	F	91.5	2388	56	1422	54	1372	Floor	Note 4	N/A	N/A	220
33	F	94	2388	72	1829	54	1372	Floor	Note 4	N/A	N/A	220
34	F	94	2388	84	2134	54	1372	Floor	Note 4	N/A	N/A	220
35	F	94	2388	96	2438	54	1372	Floor	Note 4	N/A	N/A	220

Note 1: These dimensions are not for construction. Contact your nearest Square D/Schneider Electric sales office for certified prints.
Note 2: Transformer is NEMA Type 3R Standard. Weathershield not required for outdoor use.
Note 3: Wall mounting brackets are a standard part of transformer enclosure. Accessory not required.
Note 4: Special outdoor construction required for NEMA Type 3R applications. Contact your nearest Square D/Schneider Electric sales office for details.
Note 5: Indoor/outdoor enclosure standard. Weathershield not required.
N/A: Wall mounting/ceiling mounting bracket not available due to weight of these parts.

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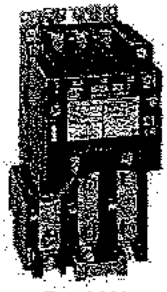
Full Voltage Starters—NEMA Rated
Class 8536



Type SCO3
Size 1, 3-Pole Starter

General Information

Type S magnetic starters are used for full-voltage starting and stopping of AC squirrel cage motors. Motor overload protection is provided via melting alloy type thermal overload relays. Type S starters are available in NEMA Sizes 00 through 7, and are designed for operation at 600 Vac, 50 to 60 Hz.

Solid State Overload Relay Protection (MOTOR LOGIC®)

These ambient insensitive overload relays are available on Sizes 00 through 6 and standard on size 7. They provide phase loss, phase unbalance protection and a power LED indication.

3-Pole Polyphase—600 Vac Maximum—50–60 Hz

NEMA Size	Continuous Current Ratings	Motor Voltage	Max. Hp	Open Type	NEMA 1 General Purpose Enclosure	NEMA 4 & 4X Watertight, Dusttight Brushed Stainless Steel Enclosure (Size 0-5)▲	NEMA 4X Watertight, Dusttight, Corrosion-Resistant Glass-Polyester Enclosure
				Type	Type	Type	Type
00	9	Separate Control■					
		200	1½	SAO12♦	SAG12♦	Use Size 0	Use Size 0
		230	1½				
		460	2				
		575	2				
0	18	Separate Control■					
		200	3	SBO2♦	SBG2♦	SBW12♦	SBW22♦
		230	3				
		460	5				
		575	5				
1	27	Separate Control■					
		200	7½	SCO3♦	SCG3♦	SCW13♦	SCW23♦
		230	7½				
		460	10				
		575	10				
2	45	Separate Control■					
		200	10	SDO1♦	SDG1♦	SDW11♦	SDW21♦
		230	15				
		460	25				
		575	25				
3	90	Separate Control■					
		200	25	SEO1♦	SEG1♦	SEW11♦	SEW21♦
		230	30				
		460	50				
		575	50				
4	135	Separate Control■					
		200	40	SFO1♦	SFG1♦	SFW11♦	SFW21♦
		230	50				
		460	100				
		575	100				
5	270	Separate Control■					
		200	75	SGO1♦	SGG1♦	SGW11♦	...
		230	100				
		460	200				
		575	200				
6	540	Separate Control■					
		200	150	SHO2♦	SHG2♦	SHW2♦	...
		230	200				
		460	400				
		575	400				
7	810	Separate Control■					
		200	...	SJO2♦	SJG2♦	SJW2♦	...
		230	300				
		460	600				
		575	600				

▲ Size 6 and 7 are rated NEMA 4 only.
■ 120 Volt Polyphase starters are wired for separate control and must be ordered with Form S (i.e., 8502SCO2V02S).
♦ Coil voltage code must be specified to order this product. Refer to standard coil voltage codes shown below.

Coil Voltage Codes

Voltage 60 Hz	Voltage 50 Hz	Code
24★	—	V01
120▼	110	V02
208	—	V08
240	220	V03
480	440	V06
600	550	V07
Specify	Specify	V99

★ 24 V coils are not available on Sizes 4–7. On Sizes 00-3, where 24 V coils are available, Form S (separate control) must be specified (i.e., order as 8502SCO2V01S).
▼ 120 Volt Polyphase contactors are wired for separate control (i.e., order as 8502SCO2V02S).

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MOTOR LOGIC—Class 9999

Isolated Auxiliary Contacts for MOTOR LOGIC Overload Relays

Overload relay auxiliary contacts are available factory installed or in kit form for field installation on MOTOR LOGIC overload relays. These contacts may be used for isolated alarm contact applications.

For Use With		Parts Kit Description	Class 9999 Type
Class & Type	NEMA Size		
8536 SA-SJ	00_B through 7	N.O. or N.C. Auxiliary Contact (Field Convertible)	AC04
9065 SS, SR, SF, ST	00_B through 7		

DIN Adapter

The DIN adapter provides a method to mount the MOTOR LOGIC overload relay to a 35 mm DIN rail.

For Use With		Parts Kit Description	Class 9999 Type
Class & Type	NEMA Size		
9065 SS or SF	00_B, 00_C, 0, and 1	DIN Adapter	DA01

Lug-Lug and Lug-Extender Kits

A Class 9999 LL0 Lug-Lug Kit can be field installed on separately mounted overload relays. The standard NEMA Size 00_B, 00_C, 0, and 1 Class 9065 Type SS and SF overload relays are supplied without lugs. A Class 9999 LB0 Lug-Extender Kit is designed for NEMA Size 00_B, 00_C, 0, and 1 Retrofit Starter Applications. This kit allows the lugs to be in the same location as the Class 9065 melting alloy overload relay, eliminating the need for additional wire length.

For Use With		Parts Kit Description	Class 9999 Type
Class & Type	NEMA Size		
9065 SS or SF	00_B, 00_C, 0, and 1	Lug-Lug Kit for separate mounting	LL0
9065 SS or SF	00_B, 00_C, 0, and 1	Lug-Extender Kit for retrofitting existing NEMA S starters	LB0

Remote Reset Module

The Remote Reset Module can be easily field installed on solid state overload relays. This module will allow the overload relay to be reset from a remote location.

For Use With		Parts Kit Description	Class 9999 Type
Class and Type	NEMA Size		
8536 SA-SJ	00_B through 7	Remote Reset Module	RR04■
9065 SS, SR, SF, ST	00_B through 7		
8536 SE-SF	3 and 4	Top Mounting Bracket	RB34▲■
9065 SS, SR, SF, ST	3 and 4		

▲ To be used to mount the remote reset module on the top of the overload relay.
■ 120 Vac power required.

MOTOR LOGIC Plus—Class 9065

Lug-Lug Kit

This kit can be field installed on separately mounted MOTOR LOGIC Plus overload relays.

For Use With		Parts Kit Description	Class 9999 Type
Class & Type	NEMA Size		
8536 SA-SH	1–6	Lug-Lug Kit	MLPL
9065 SP	1–6		

Software Kit

Solutions software program allows an IBM PC compatible computer (with Windows 95 or greater) to communicate with a MOTOR LOGIC Plus overload relay connected to an RS-485 network using MODBUS protocol.

For Use With		Parts Kit Description	Class 9999 Type
Class & Type	NEMA Size		
8536 SA-SH	1–6	Software Kit	MLPS
9065 SP	1–6		

Communication Module

This module allows the MOTOR LOGIC Plus overload relay to support RS-485 electrical communications standards. Up to 99 MOTOR LOGIC Plus overload relays can be controlled and monitored from one remote personal computer.

For Use With		Parts Kit Description	Class 9999 Type
Class and Type	NEMA Size		
8536 SA-SH	1–6	Communication Module	MB22
9065 SP	1–6		

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Factory Modifications (Forms)

For Full Voltage Contactors & Starters and Solid State Overload Relays

Full Voltage Controllers Only

Classes 8502, 8536, 8538, 8539, 8702, 8736, 8738, 8739, 8810, 8811 and 8812

	Factory Modifications	Enclosure Type	Form	NEMA Size 00	0	1	2	3	4	5	6	7
Overload Relays	**Non-Compensated Bimetallic Overload Relays**											
	Single Phase:											
	Types SB–SD (Sizes 0–2)■	Any	B1	—	▬	▬	▬	—	—	—	—	—
	Polyphase:											
	Two Element—For 2 Phase Only											
	Types SB–SD (Sizes 0–2)	Any	B1	—	▬	▬	▬	—	—	—	—	—
	Three Element											
	Types SB–SD (Sizes 0–2)	Any	B2	—	▬	▬	▬	—	—	—	—	—
	Type SG (Size 5)	Any	B2	—	—	—	—	—	—	▬	—	—
	Type SH (Size 6)	Any	B2	—	—	—	—	—	—	—	▬	▲
	Ambient Compensated Bimetallic Overload Relays											
	Three Element											
	Types SB–SD (Sizes 0–2)	1, 4, 7, 9, 12	B	—	▬	▬	▬	—	—	—	—	—
	Types SE–SF (Sizes 3 & 4)	Any	Y59	—	—	—	—	▬	▬	—	—	—
	Type SG (Size 5)	Any	B	—	—	—	—	—	—	▬	—	—
	Type SH (Size 6)	Any	B	—	—	—	—	—	—	—	▬	▲
	Overload Relays—General											
	Omit overload protection from combination starters. (Classes 8538, 8539, 8738, 8739 only) Do not use with MAG-GARD® Circuit Breakers. Deduct per starter	Any	Y76	—	▬	▬	▬	▬	▬	▬	▬	▬
	Modify Size 3 Type SE starters with melting alloy overload relays to accept Type FB quick trip or SB slow trip thermal units and Size 4 Type SF starters to accept Type FB quick trip thermal units. (Rejects Type CC standard trip thermal units.)	Any	Y81	—	—	—	—	N/C	N/C	—	—	—
	Substitute 9999 SO4 isolated alarm contact (N.O.) on melting alloy overload relay	Any	Y342	▬	▬	▬	▬	▬	▬	▬	▬	▲
	Substitute 9999 SO5 isolated alarm contact (N.C.) on melting alloy overload relay	Any	Y344	▬	▬	▬	▬	▬	▬	▬	▬	▲

▲ Size 7 uses a solid state overload relay as standard. See Class 8536 for complete details.
■ Single phase bimetallic overload relays for Type S Sizes 0–2 require two (2) thermal units per starter.
● For Classes 8736, 8738 and 8739 Type SG, consult your nearest Square D/Schneider Electric sales office.

Solid State Overload Relay Factory Modifications (Forms)

The solid state overload relay is available on NEMA Size 00–7.
For Class 8536, 8538, 8539, 8736, 8738, 8739 and 8810 devices.

Form Description

H # # #

Type S Starter with MOTOR LOGIC®
Solid State Overload Relay
- 1—MOTOR LOGIC, Base Unit, Trip Class 10
- 2—MOTOR LOGIC, Base Unit, Trip Class 20
- 3—MOTOR LOGIC, Feature Unit
- 0—No additional modifications
- 1—N.O. Auxiliary Contact (Field Convertible to N.C.)

Special Overload/Contactor Size Combinations (Base Unit & Feature Units):
(Must Be Specified On Size 00 Starter Orders)
- Blank - Overload Matched to Starter Size (i.e., Size 1 contactor & 9-27 A overload)
- 0—A 6–18 A overload on a starter size as indicated by the Starter Catalog Number
- 1—A 9–27 A overload on a starter size as indicated by the Starter Catalog Number
- 2—A 15–45 A overload on a starter size as indicated by the Starter Catalog Number
- 3—A 30–90 A overload on a starter size as indicated by the Starter Catalog Number
- 4—A 45–135 A overload on a starter size as indicated by the Starter Catalog Number
- 8—A 1.5–4.5 A overload on a starter size as indicated by the Starter Catalog Number (only offered on Feature Units)
- 9—A 3–9 A overload on a starter size as indicated by the Starter Catalog Number

SPECIAL NOTE for Class 8810 devices:
You MUST SPECIFY TWO SEPARATE FORM NUMBERS TO GET MOTOR LOGIC OVERLOADS ON TWO SPEED STARTERS. The first form number is for the low speed winding and the second is for the high speed winding.
EXAMPLE: Open Style, Size 4 Two Speed Starter with MOTOR LOGIC Overload Relays Required.
Single Winding, 460 V, Constant Horsepower
High Speed FLA = 96 A
Low Speed FLA = 27 A (use Size 2 Overload)

Catalog Number to Order: 8810 SF01V02 form S H20 H202
Where: Form H20 is a Size 4 Contactor with a 45-135 A MOTOR LOGIC Overload Relay for the High Speed and form H202 is a 15–45 A MOTOR LOGIC Overload Relay on the low speed contactor.

Classes 8536, 8538, 8539, 8736, 8738, 8739 and 8810

Factory Modifications		Form	NEMA Size (Overload Current Range) 00 3–9 A	0 6–18 A	1 9–27 A	2 15–45 A	3 30–90 A	4 45–135 A	5 90–270 A	6 180–540 A	7 270–810 A
MOTOR LOGIC Solid State Overload Relay	Base Unit, Trip Class 10	H10	▬	▬	▬	▬	▬	▬	▬	—	—
	Base Unit, Trip Class 20	H20	▬	▬	▬	▬	▬	▬	▬	—	—
	Feature Unit	H30	▬	▬	▬	▬	▬	▬	▬	▬	▬
MOTOR LOGIC Solid State Overload Relay with Auxiliary Contact	Base Unit, Trip Class 10	H11	▬	▬	▬	▬	▬	▬	▬	—	—
	Base Unit, Trip Class 20	H21	▬	▬	▬	▬	▬	▬	▬	—	—
	Feature Unit	H31	▬	▬	▬	▬	▬	▬	▬	▬	▬

Special Starter Combinations with MOTOR LOGIC Overload Relay Protection

NEMA Contactor Size	Solid State Overload Relay Size 00B	00C	0	1	2	3	4
00	★	Std					
0	★	★	Std				
1	★	★	★	Std			

NEMA Contactor Size	Solid State Overload Relay Size 00B	00C	0	1	2	3	4
2	★	★	★	★	Std		
3	n/a	n/a	n/a	n/a	n/a	Std	
4	n/a	n/a	n/a	n/a	n/a	★	Std

★ Possible factory starter combinations available.

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Push Buttons—Class 9001 Type SK—30 mm

Corrosion Resistant Pilot Lights

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Pilot Lights—UL Types 4, 4X, 13/NEMA 4, 4X, 13

For use in hazardous locations—See page 17-79.
Legend plate not included.

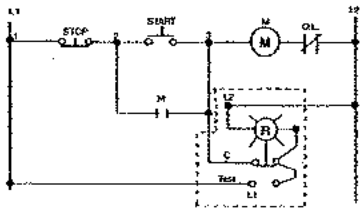
Description		Voltage	Style	With Red Fresnel Color Cap	With Green Fresnel Color Cap	With Other Color Cap	Price	Without Color Cap
9001SKP1	Standard Pilot Light (Non-metallic fresnel color cap shown)	110–120 V, 50–60 Hz	Transformer	SKP1R31	SKP1G31	SKP1■	$102.	SKP1
		220–240 V, 50–60 Hz	Transformer	SKP7R31	SKP7G31	SKP7■	102.	SKP7
		24–28 Vac/dc	Full Voltage	SKP35R31	SKP35G31	SKP35■	83.	SKP35
		For other voltages see Table ▲	Transformer, Flashing or LED♦	SKP▲R31	SKP▲G31	SKP▲■	102.	SKP▲
			Full Voltage, Neon or Resistor★	SKP▲R31	SKP▲G31	SKP▲■	83.	SKP▲
9001SKT1	Push-To-Test Pilot Light (Non-metallic fresnel color cap shown)	110–120 V, 50–60 Hz	Transformer	SKT1R31	SKT1G31	SKT1■	131.	SKT1
		220–240 V, 50–60 Hz	Transformer	SKT7R31	SKT7G31	SKT7■	131.	SKT7
		24–28 Vac/dc	Full Voltage	SKT35R31	SKT35G31	SKT35■	111.	SKT35
		For other voltages see Table ▲	Transformer, Flashing or LED♦	SKT▲R31	SKT▲G31	SKT▲■	131.	SKT▲
			Full Voltage, Neon or Resistor★	SKT▲R31	SKT▲G31	SKT▲■	111.	SKT▲
9001SKTR38	Remote Test Pilot Light (Non-metallic fresnel color cap shown)	120 Vac Only	Resistor	SKTR38R31	SKTR38G31	SKTR38■	131.	SKTR38
		24–28 Vac Only	Full Voltage	SKTR35R31	SKTR35G31	SKTR35■	131.	SKTR35
		For other voltages see Tables ▲■▼	Full Voltage or Resistor ▼	SKTR▲R31	SKTR▲G31	SKTR▲■	131.	SKTR▲
Pilot Light For Intrinsically Safe Circuits (NEMA 4X)	Intrinsically safe equipment must not release electrical or thermal energy capable of igniting certain explosive or combustible hazardous atmospheres, for which the equipment has been tested. These pilot lights are intrinsically safe when used with suitable approved barrier or barrier relay. These pilot lights are Factory Mutual (FM) approved. Consult your local Square D sales office for further details. These pilot lights are fully encapsulated—there are no replaceable parts—except for the SK40 ring nut. Use KN100 series plastic legend plates as shown on Pages 17-81 and 17-82.	Operating Voltage Range: 20–30 Vac/dc; Nominal Current: 25 mA; V max = 32 V, I max = 165 mA		KP44R	KP44G	KP44Y (Yellow Color Cap)	119.	...	...

▲ Add the voltage assembly code as chosen from table, page 17-77.
EXAMPLE: SKT▲R31 with 60 Vac red LED voltage = SKT37LRR31.
■ Add the color code as chosen from the color cap table below.
EXAMPLE: SKP1■ with a blue fresnel cap = SKP1L31.
♦ The cap must be the same color as the LED light module chosen, e.g., for green LED, use green color cap.
★ On neon light modules, use clear color caps only.
▼ Use only full voltage or resistor voltage assembly codes on remote test pilot lights. Do not choose LED, neon or transformer codes. For AC use only.

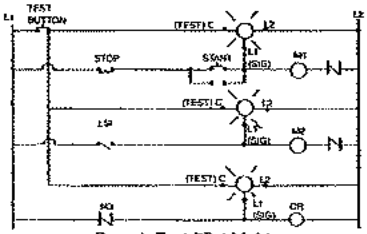
Color Caps

Color	■ Plastic Fresnel	■ Plastic Domed
Amber	A31	A9
Blue	L31	L9
Clear	C31	C9
Green	G31	G9
Red	R31	R9
White	W31	W9
Yellow	Y31	Y9

Typical Wiring Diagram



Push-To-Test Pilot Light



Remote Test Pilot Light

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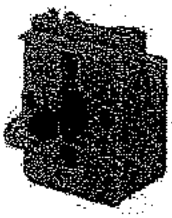
Standard Light Modules for Types K, SK, and KX Control Units ★

For use in hazardous locations—See page 17-79.

- Neon type light modules—use CLEAR color caps only.
- LED light modules require that the color cap and the LED be the same color, or use a clear color cap.



Voltage	Description	For Use With Single Lamp ⅞L Operators as Indicated ▲	Light Module Type ♦	Voltage Assembly Code	Rating	Replacement Lamp Part Number ♦▼
6 Vac/dc	Full Voltage	All	KM31	31	.9 VA	2550101020
12–14 Vac/dc	Full Voltage	All	KM32	32	1.2 VA	2550101037
18 Vac/dc	Resistor	All	KM33	33	1.4 VA	2550101037
24–28 Vac/dc	Full Voltage	All	KM35	35	1.2 VA	2550101002
24–28 Vac/dc	LED Red	All Except■	KM35LR	35LR	.28 VA	6508805210
24–28 Vac/dc	LED Green	All Except■	KM35LG	35LG	.28 VA	6508805212
24–28 Vac/dc	LED Yellow	All Except■	KM35LY	35LY	.28 VA	6508805211
24–28 Vac/dc	LED White	All Except■	KM35LW	35LW	.28 VA	6508805214
24–28 Vac/dc	LED Blue	All Except■	KM35LL	35LL	.28 VA	6508805213
48 Vac/dc	Full Voltage	All	KM36	36	2.6 VA	2550101025
110–120 V, 50–60 Hz	Transformer	All Except■	KM1	1	2.4 VA	2550101020
110–120 V, 50–60 Hz	Flashing	All Except■	KMF1	F1	.85 VA	2550101036
120 Vac/dc	Resistor	All	KM38	38	3.0 VA	2550101027
120 Vac/dc	Full Voltage	All	KM38	38	3.0 VA	2550101027
120 Vac/dc	Neon	All Except■	KM11	11	0.2 VA	2550101013
120 Vac/dc	LED Red	All Except■	KM38LR	38LR	1.4 VA	6508805210
120 Vac/dc	LED Green	All Except■	KM38LG	38LG	1.4 VA	6508805212
120 Vac/dc	LED Yellow	All Except■	KM38LY	38LY	1.4 VA	6508805211
120 Vac/dc	LED White	All Except■	KM38LW	38LW	1.4 VA	6508805214
120 Vac/dc	LED Blue	All Except■	KM38LL	38LL	1.4 VA	6508805213
208–220 V, 50–60 Hz	Transformer	All Except■	KM3	3	2.5 VA	2550101020
220–240 V, 50–60 Hz	Transformer	All Except■	KM7	7	2.0 VA	2550101020
240 Vac/dc	Resistor	All Except■	KM25	25	6.0 VA	2550101027
240 Vac/dc	Neon	All Except■ and KX	KM12	12	0.3 VA	2550101013
277 V, 50–60 Hz	Transformer	All Except■	KM9	8	2.4 VA	2550101020
380–480 V, 50–60 Hz	Transformer	All Except■	KM5	5	2.8 VA	2550101020
480 Vac/dc	Neon	All Except■ and KX	KM14	14	0.5 VA	2550101013
550–600 V, 50–60 Hz	Transformer	All Except■	KM6	6	2.5 VA	2550101020

Shallow Depth Light Modules For Types K and SK Control Units ★

For use in hazardous locations—See page 17-79. Reduces the depth of illuminated push buttons with contact blocks by over 33%.

Voltage	Description	Light Module Type ♦	Voltage Assembly Code	Rating	Replacement Lamp Part Number ♦
24–28 Vac/dc	Full Voltage	KM55	55	1.2 VA	2550101002
110–120 Vac/dc	Full Voltage	KM58	58	3.0 VA	2550101027

▲ 9001K, SK, KX.
■ Do not use on any remote test version pilot light.
♦ All light modules with an LED above 12 V use a 14 V bipolar LED.
★ For use with all operators except KX and remote test pilot.
▼ Check light module label for series and replacement number.

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Pilot Lights—UL Types 4, 4X, 13/NEMA 4, 4X, 13

For use in hazardous locations—See page 17-79.
Legend plate not included.

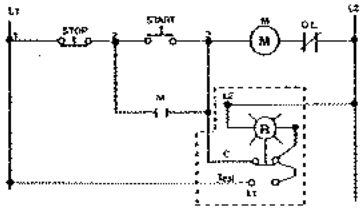
Description		Voltage	Style	With Red Fresnel Color Cap	With Green Fresnel Color Cap	With Other Color Cap	Without Color Cap
9001SKP1	Standard Pilot Light (Non-metallic fresnel color cap shown)	110–120 V, 50–60 Hz	Transformer	SKP1R31	SKP1G31	SKP1■	SKP1
		220–240 V, 50–60 Hz	Transformer	SKP7R31	SKP7G31	SKP7■	SKP7
		24–28 Vac/dc	Full Voltage	SKP35R31	SKP35G31	SKP35■	SKP35
		For other voltages see Table ▲	Transformer, Flashing or LED♦	SKP▲R31	SKP▲G31	SKP▲■	SKP▲
			Full Voltage, Neon or Resistor★	SKP▲R31	SKP▲G31	SKP▲■	SKP▲
9001SKT1	Push-To-Test Pilot Light (Non-metallic fresnel color cap shown)	110–120 V, 50–60 Hz	Transformer	SKT1R31	SKT1G31	SKT1■	SKT1
		220–240 V, 50–60 Hz	Transformer	SKT7R31	SKT7G31	SKT7■	SKT7
		24–28 Vac/dc	Full Voltage	SKT35R31	SKT35G31	SKT35■	SKT35
		For other voltages see Table ▲	Transformer, Flashing or LED♦	SKT▲R31	SKT▲G31	SKT▲■	SKT▲
			Full Voltage, Neon or Resistor★	SKT▲R31	SKT▲G31	SKT▲■	SKT▲
9001SKTR38	Remote Test Pilot Light (Non-metallic fresnel color cap shown)	120 Vac Only	Resistor	SKTR38R31	SKTR38G31	SKTR38■	SKTR38
		24–28 Vac Only	Full Voltage	SKTR35R31	SKTR35G31	SKTR35■	SKTR35
		For other voltages see Tables ▲■▼	Full Voltage or Resistor ▼	SKTR▲R31	SKTR▲G31	SKTR▲■	SKTR▲
Pilot Light For Intrinsically Safe Circuits (NEMA 4X)	Intrinsically safe equipment must not release electrical or thermal energy capable of igniting certain explosive or combustible hazardous atmospheres, for which the equipment has been tested. These pilot lights are intrinsically safe when used with suitable approved barrier or barrier relay. These pilot lights are Factory Mutual (FM) approved. Consult your local Square D sales office for further details. These pilot lights are fully encapsulated—there are no replaceable parts—except for the SK40 ring nut. Use KN100 series plastic legend plates as shown on Pages 17-81 and 17-82.	Operating Voltage Range: 20–30 Vac/dc; Nominal Current: 25 mA; V max = 32 V, I max = 165 mA		KP44R	KP44G	KP44Y (Yellow Color Cap)	

▲ Add the voltage assembly code as chosen from table, page 17-77.
EXAMPLE: SKT▲R31 with 60 Vac red LED voltage = SKT37LRR31.
■ Add the color code as chosen from the color cap table below.
EXAMPLE: SKP1■ with a blue fresnel cap = SKP1L31.
♦ The cap must be the same color as the LED light module chosen, e.g., for green LED, use green color cap.
★ On neon light modules, use clear color caps only.
▼ Use only full voltage or resistor voltage assembly codes on remote test pilot lights. Do not choose LED, neon or transformer codes. For AC use only.

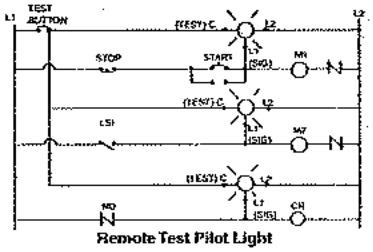
Color Caps

Color	■ Plastic Fresnel	■ Plastic Domed
Amber	A31	A9
Blue	L31	L9
Clear	C31	C9
Green	G31	G9
Red	R31	R9
White	W31	W9
Yellow	Y31	Y9

Typical Wiring Diagram



Push-To-Test Pilot Light



Remote Test Pilot Light

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Push Buttons—Class 9001 Type K, SK and KX—30 mm

Electrical Components

Standard Light Modules for Types K, SK, and KX Control Units ★

For use in hazardous locations—See page 17-79.

- Neon type light modules—use CLEAR color caps only.
- LED light modules require that the color cap and the LED be the same color, or use a clear color cap.

Voltage	Description	For Use With Single Lamp Kit Operators as Indicated ▲	Light Module Type ♦	Voltage Assembly Code	Rating	Replacement Lamp Part Number ♦ ▼
6 Vac/dc	Full Voltage	All	KM31	31	.9 VA	2550101029
12–14 Vac/dc	Full Voltage	All	KM32	32	1.2 VA	2550101037
18 Vac/dc	Resistor	All	KM33	33	1.4 VA	2550101037
24–28 Vac/dc	Full Voltage	All	KM35	35	1.2 VA	2550101002
24–28 Vac/dc	LED Red	All Except■	KM35LR	35LR	.28 VA	6508805210
24–28 Vac/dc	LED Green	All Except■	KM35LG	35LG	.28 VA	6508805212
24–28 Vac/dc	LED Yellow	All Except■	KM35LY	35LY	.28 VA	6508805211
24–28 Vac/dc	LED White	All Except■	KM35LW	35LW	.28 VA	6508805214
24–28 Vac/dc	LED Blue	All Except■	KM35LL	35LL	.28 VA	6508805213
48 Vac/dc	Full Voltage	All	KM36	36	2.6 VA	2550101025
110–120 V, 50–60 Hz	Transformer	All Except■	KM1	1	2.4 VA	2550101020
110–120 V, 50–60 Hz	Flashing	All Except■	KMF1	F1	.85 VA	2550101036
120 Vac/dc	Resistor	All	KM38	38	3.0 VA	2550101027
120 Vac/dc	Full Voltage	All	KM38	38	3.0 VA	2550101027
120 Vac/dc	Neon	All Except■	KM11	11	0.2 VA	2550101013
120 Vac/dc	LED Red	All Except■	KM38LR	38LR	1.4 VA	6508805210
120 Vac/dc	LED Green	All Except■	KM38LG	38LG	1.4 VA	6508805212
120 Vac/dc	LED Yellow	All Except■	KM38LY	38LY	1.4 VA	6508805211
120 Vac/dc	LED White	All Except■	KM38LW	38LW	1.4 VA	6508805214
120 Vac/dc	LED Blue	All Except■	KM38LL	38LL	1.4 VA	6508805213
208–220 V, 50–60 Hz	Transformer	All Except■	KM3	3	2.5 VA	2550101020
220–240 V, 50–60 Hz	Transformer	All Except■	KM7	7	2.0 VA	2550101020
240 Vac/dc	Resistor	All Except■	KM25	25	6.0 VA	2550101027
240 Vac/dc	Neon	All Except■ and KX	KM12	12	0.3 VA	2550101013
277 V, 50–60 Hz	Transformer	All Except■	KM8	8	2.4 VA	2550101020
380–480 V, 50–60 Hz	Transformer	All Except■	KM5	5	2.8 VA	2550101020
480 Vac/dc	Neon	All Except■ and KX	KM14	14	0.5 VA	2550101013
550–600 V, 50–60 Hz	Transformer	All Except■	KM6	6	2.5 VA	2550101020

Note: Standard light modules are available in other voltages. Contact your nearest Square D/Schneider Electric sales office for details.

Shallow Depth Light Modules For Types K and SK Control Units ★

For use in hazardous locations—See page 17-79. Reduces the depth of illuminated push buttons with contact blocks by over 33%.

Voltage	Description	Light Module Type ♦	Price of Light Module	Voltage Assembly Code	Rating	Replacement Lamp Part Number ♦
24–28 Vac/dc	Full Voltage	KM55	$57.	55	1.2 VA	2550101002
110–120 Vac/dc	Full Voltage	KM58	57.	58	3.0 VA	2550101027

▲ 9001K, SK, KX.
■ Do not use on any remote test version pilot light.
♦ All light modules with an LED above 12 V use a 14 V bipolar LED.
★ For use with all operators except KX and remote test pilot.
▼ Check light module label for series and replacement number.

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Ring Nuts

Used On	Type	Used On	Type
K1L	K44	SK1L	SK44
K36-K37	K45	---	---
K70-K73	K45	---	---
K20, K21, K22, K23	K45	SK20, SK21, SK22, SK23	SK45
K20, K21, K22, K23 ♦	SK46	SK20, SK21, SK22, SK23 ♦	SK46
K2L	K49	SK2L	SK49
K3L	K111	---	---
KP, KTR	K41	SKP, SKTR	SK41
KR1	K41	SKR1	SK41
KR11	K42	SKR11	SK42
KR12 ▲	K42	SKR12 ▲	SK42
KR12 ■	K41	SKR12 ■	SK41
KR13, 14, 15	K55	...	...
KR2	K42	SKR2	SK42
KR20	K49	...	...
KR24	K49	...	...
KR25	K49	...	...
KR3	K40	SKR3	SK40
KR4	K41	SKR4	SK41
KR5	K41	SKR5	SK41
KR6	K47	...	---
KR67	K47	...	---
KR7	K47	...	---
KR8	K58	SKR8	6509704401
KR9	K41	SKR9	SK41
KS	K45	SKS	SK45
KS ♦	SK46	SKS ♦ SKRU11 SKRU1,2,3,4,5,10	SK46 SK41 SK40
KT	K49	SKT	SK49

▲ Maintained button of two button operator.
■ Momentary button of two button operator.
♦ Secondary ring nut (holds knob on selector switch or potentiometer).

Replacement Lamps For Series A–F (black) Light Modules

Light Module Type	Lamp Number (ANSI)	Square D Replacement Lamps Part Number
KM1	GE44★	...
KM2	GE1490	2550101003
KM3	GE44★	...
KM4	GE1490	2550101003
KM5	GE44★	...
KM6	GE44★	...
KM7	GE44★	...
KM8	GE44★	...
KM9	GE755	2550101020
KM11	CMDK1A5	2550105014
KM12	CMDK1A5	2550105014
KM13	CMDK1A5	2550105014
KM14	CMDK1A5	2550105014
KM15	CMDK1A5	2550105014
KM21	SYL12PSB	2550105003
KM22	SYL12PSB	2550105003
KM23	SYL28PSB	2550105008
KM25	SYL120PSB	2550105005
KM31	SYL6PSB	2550105007
KM32	SYL12PSB	2550105003
KM34	SYL24PSB	2550105004
KM35	SYL28PSB	2550105008
KM36	SYL48PSB	2550105009
KM37	SYL60PSB	2550105010
KM38	SYL120PSB	2550105005

★ GE44 and GE755 are interchangeable (GE755 gives longer life). If a GE44 lamp is ordered, a GE755 (2550101020) will be substituted. For a replacement lamp in a current series light module see the light module listing on page 17-77.

Repair Parts

Description	Part Number
E10 Key	2941101100
Gray cap for KR11, KR12, SKR11, or SKR12	3105217001
Clear plastic top (only) for 9001K44 & SK44 Ring Nut	4487D63X1
Gasket for Type K and SK Push-Pull Knob	6509701801
Gasket for Plastic Illuminated Lens	6509701901
Gasket for Type K and SK selector switch knob	3105406401
Black Compensating Gasket (Type K and SK Operators)	6509702001
Liner for Non-Illuminated Operators	6509704901
Locking Thrust Washer	6512231201
Nylon Spacer	6509705001
Locking Thrust Washer (Std. Type SK Operator)	6512240601
Push-Pull Mushroom Adapter ▼	K54
Rubber Boot for Joystick	6512243201
Knob on Joysticks without latch	4458D20X3

▼ Allows Type -20 and -21 mushroom color caps to be used on push-pull operators. Use of 9001K54 voids Type 6 rating.

KU Replacement Ring Nuts (Threaded Inside and Out)

Used On	Part Number
KU1 through KU8, KU27, KU37, KU47	3105204101
KU17, KU18	3105205901

Interlock

For mechanically interlocking two push buttons so that only one button can be depressed at a time. A Type K3 attachment is furnished with the **9001 KR11, KR12, SKR11, SKR12, SKRU1** and **SKRU11** operators. However, these are maintained operators and the K3 interlock serves to release one of the buttons when the other is depressed. When used with momentary contact buttons, the K3 interlock does not hold the buttons in the depressed position. It simply prevents pushing both buttons at the same time.
The Type K3 interlock is mounted behind the operators. Operators not included.

Type	
K3	

Screwdriver

Used to tighten mounting screws on contact blocks and light modules.

Type	
K69	

Wrenches

K95

K1

Where Used	Type
For tightening ring nuts on Types K, KX, SK and J control units	K95
For protective cap kits	K1

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Push Buttons—Class 9001 Type SK—30 mm

Corrosion Resistant Non-Illuminated Operators

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Non-Illuminated Momentary Push Button Operators—UL Types 4, 4X, 13/NEMA 4, 4X, 13

For use in hazardous locations—See page 17-79.
Contact blocks and legend plate not included unless otherwise noted.

Description	Color	Operator with 1 N.O. and 1 N.C. Contact (KA1)	Operator with 1 N.O. Contact (KA2)	Operator with 1 N.C. Contact (KA3)	Operator Only No Contacts ▼
9001SKR1B Full Guard	Black	SKR1BH13	SKR1BH5	SKR1BH6	SKR1B
	Red	SKR1RH13	SKR1RH5	SKR1RH6	SKR1R
	Green	SKR1GH13	SKR1GH5	SKR1GH6	SKR1G
	Universal ▲	SKR1UH13	SKR1UH5	SKR1UH6	SKR1U
	Other ■	SKR1■H13	SKR1■H5	SKR1■H6	SKR1■
9001SKR3B No Guard	Black	SKR3BH13	SKR3BH5	SKR3BH6	SKR3B
	Red	SKR3RH13	SKR3RH5	SKR3RH6	SKR3R
	Green	SKR3GH13	SKR3GH5	SKR3GH6	SKR3G
	Universal ▲	SKR3UH13	SKR3UH5	SKR3UH6	SKR3U
	Other ■	SKR3■H13	SKR3■H5	SKR3■H6	SKR3■
9001SKR2B Extended Guard	Black	SKR2BH13	SKR2BH5	SKR2BH6	SKR2B
	Red	SKR2RH13	SKR2RH5	SKR2RH6	SKR2R
	Green	SKR2GH13	SKR2GH5	SKR2GH6	SKR2G
	Universal ▲	SKR2UH13	SKR2UH5	SKR2UH6	SKR2U
	Other ■	SKR2■	SKR2■H5	SKR2■H6	SKR2■

▲ The universal push button operators include one each of the following color inserts: black, red, green, yellow, orange, blue and white.
■ See table below.

Description	Color	Operator with 1 N.O. and 1 N.C. Contact (KA1)	Operator with 1 N.O. Contact (KA2)	Operator with 1 N.C. Contact (KA3)	Operator Only No Contacts ▼
9001SKR4B 1¾ Mushroom Button	**Snap-In Mushroom Button**				
	Black	SKR4BH13	SKR4BH5	SKR4BH6	SKR4B
	Red	SKR4RH13	SKR4RH5	SKR4RH6	SKR4R
	Red ♦	SKR4R05H13	SKR4R05H5	SKR4R05H6	SKR4R05
	Green	SKR4GH13	SKR4GH5	SKR4GH6	SKR4G
	Other ★	SKR4★H13	SKR4★H5	SKR4★H6	SKR4★
	Screw-On Mushroom Button with Set Screw Security				
	Black	SKR24BH13	SKR24BH5	SKR24BH6	SKR24B
	Red	SKR24RH13	SKR24RH5	SKR24RH6	SKR24R
	Green	SKR24GH13	SKR24GH5	SKR24GH6	SKR24G
	Other ★	SKR24★H13	SKR24★H5	SKR24★H6	SKR24★
9001SKR5B 2¾ Mushroom Button	**Snap-In Mushroom Button**				
	Black	SKR5BH13	SKR5BH5	SKR5BH6	SKR5B
	Red	SKR5RH13	SKR5RH5	SKR5RH6	SKR5R
	Red ♦	SKR5R05H13	SKR5R05H5	SKR5R05H6	SKR5R05
	Green	SKR5GH13	SKR5GH5	SKR5GH6	SKR5G
	Other ★	SKR5★H13	SKR5★H5	SKR5★H6	SKR5★
	Screw-On Mushroom Button with Set Screw Security				
	Black	SKR25BH13	SKR25BH5	SKR25BH6	SKR25B
	Red	SKR25RH13	SKR25RH5	SKR25RH6	SKR25R
	Green	SKR25GH13	SKR25GH5	SKR25GH6	SKR25G
	Other ★	SKR25★H13	SKR25★H5	SKR25★H6	SKR25★

♦ Knob has the words "Emergency Stop" in raised letters highlighted in white for readability.
★ See table below.
▼ These operators can be ordered complete with contact blocks. For maximum block usage, see page 17-85. Add the "H" number chosen from page 17-80 to the end of the operator type number and add the cost of the "H" number to the operator cost.

Color	■ SKR1, 2, 3 Place Color Code in Type Number	★ SKR4, 5, 24, 25 Place Color Code in Type Number
Blue	L	L
Yellow	Y	Y
White	W	...
Orange	S	S
Gray	E	...

For additional information, reference Catalog #9001CT0301.

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Push Buttons—Class 9001 Type K, SK and KX—30 mm

Type K, SK and KX—30 mm
Class 9001

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The Class 9001 Type KA contact blocks are FINGERSAFE® contact blocks (meeting VDE 0106 Part 100). They have one screw mounting and captive (backed out) plus/minus terminal screws. These contact blocks are double-break, direct-acting contacts. Because of the wiping action of these contacts, they are suitable for use with programmable controllers. All contact blocks listed below accept up to 2 #12–#24 AWG solid or stranded wires. Recommended tightening torque for screw terminals is 7 in-lbs.

Standard Contact Blocks

Description	Symbol	Type
(Clear Cover)	Direct-Acting	KA1
(Green Cover)		KA2
(Red Cover)	Direct-Acting	KA3
(Clear Cover)	N.O. Contact Early Closing	KA4
(Red Cover)	N.C. Contact Late Opening	KA5
(Green Cover)	N.O. Contact Early Closing	KA6

Additional Circuit Arrangements Available

Sequencing ▲ N.O. Contact of KA4 closes before N.O. Contact on KA1	KA4 KA1	Order One Type KA4 and One Type KA1
Overlapping ▲ N.O. Contact of KA4 closes before N.C. Contact of KA5 Opens	KA4 KA5	Order One Type KA4 and One Type KA5

▲ For push buttons or two-position selector switches only. For sequencing or overlapping contacts on other operators, consult your nearest Square D/Schneider Electric sales office.

Symbol	Contact Blocks with Binder Head Screws (not FINGERSAFE) Type	Quantity*	Gold Flashed Contacts with Standard Pressure Wire Terminals Type
	KA21	25–Up	KA31
	KA22	25–Up	KA32
	KA23	25–Up	KA33
N.O. Early Closing	KA24	25–Up	KA34
N.C. Contact Late Opening	KA25	25–Up	KA35

* Minimum order quantity is 25. The price represents one individual contact block.

Contact blocks listed below are not FINGERSAFE, but provide:

- Terminals that accept ring tongue/fork tongue connectors
- Short single circuit contact blocks (0.75" deep vs. 0.97" deep on the FINGERSAFE)
- Same as old style Series G product available prior to March, 1989.
- Use form Y238 (add to catalog # as suffix— Example: 9001KRU1H13Y238)

Symbol	Type	Symbol	Type
	KA1G	N.O. Contact Early Closing	KA4G
	KA2G	N.C. Contact Late Opening	KA5G
	KA3G	N.O. Contact Early Closing	KA6G

Contact blocks listed below are not FINGERSAFE, but have Quick-Connect terminals.

Symbol	Type
	KA12
	KA13

Dimensions.....Catalog 9001CT0301

Maximum Current Ratings For Control Circuit Contacts—Types KA1–KA6, KA21–25, KA31–35, KA1G–KA6G

Volts	AC Inductive (NEMA / UL Type A600) 35% Power Factor Make Amperes	Make VA	Break Amperes	Break VA	Continuous Carrying Amperes	Resistive 75% Power Factor Make, Break and Continuous Amperes	Volts	DC Inductive and Resistive (NEMA Q600) Make and Break KA1	KA2 KA3	KA4	KA5 KA6	Continuous Carrying Amperes
120	60	7200	6.0	720	10	10	125	0.55	0.55	---	---	2.5
240	30	7200	3.0	720	10	10	250	0.27	0.27	---	---	2.5
480	15	7200	1.5	720	10	10	600	0.10	0.10	---	---	2.5
600	12	7200	1.2	720	10	10						

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Push Buttons and Operator Interface Specifiers Guide
Class 9001, Type K, SK — 30 mm
Common Operators

For use in hazardous locations – See page 150.

"START" Push Buttons

Operator Style	Description	Contact Block	Button Color	Type	Legend Plate
30.5 mm Industrial (Metal)			Black	KR1BH13	KN201SP
30.5 mm Corrosion Resistant (Non Metallic)			Black	SKR1BH13	KN101SP

"STOP" Push Buttons

Operator Style	Description	Contact Block	Button Color	Type	Legend Plate
30.5 mm Industrial (Metal)			Red	KR1RH13	KN202RP
30.5 mm Corrosion Resistant (Non Metallic)			Red	SKR1RH13	KN102RP

"OFF – ON" Selector Switch

Operator Style	Description	Contact Sequence / Contact Block Included	Knob Color	Type	Legend Plate
30.5 mm Industrial (Metal)		1 0 / 0 1	Black	KS11BH13	KN244SP
30.5 mm Corrosion Resistant (Non Metallic)			Black	SKS11BH13	KN144SP

"HAND – OFF – AUTO" Selector Switch

Operator Style	Description	Contact Sequence / Contact Block Included	Knob Color	Type	Legend Plate
30.5 mm Industrial (Metal)		1 0 0 / 0 0 1	Black	KS43BH13	KN260SP
30.5 mm Corrosion Resistant (Non Metallic)			Black	SKS43BH13	KN160SP

RED – 120 Vac – "ON" Pilot Light

Operator Style	Description	Type	Legend Plate
30.5 mm Industrial (Metal)		KP1R31	KN203SP
30.5 mm Corrosion Resistant (Non Metallic)		SKP1R31	KN103SP

GREEN – 120 Vac – "OFF" Pilot Light

Operator Style	Description	Type	Legend Plate
30.5 mm Industrial (Metal)		KP1G31	KN204SP
30.5 mm Corrosion Resistant (Non Metallic)		SKP1G31	KN104SP

RED – 120 Vac – "ON" Push-To-Test Pilot Light

Operator Style	Description	Type	Legend Plate
30.5 mm Industrial (Metal)		KT1R31	KN203SP
30.5 mm Corrosion Resistant (Non Metallic)		SKT1R31	KN103SP

GREEN – 120 Vac –"OFF" Push-To-Test Pilot Light

Operator Style	Description	Type	Legend Plate
30.5 mm Industrial (Metal)		KT1G31	KN204RP
30.5 mm Corrosion Resistant (Non Metallic)		SKT1G31	KN104RP

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Marking

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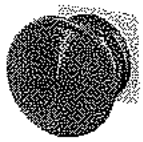
Non-Illuminated Momentary Push Button Operators – UL Types 4, 13/NEMA Types 4, 13

For use in hazardous locations – See page 150.
Contact blocks and legend plate not included unless otherwise noted.

Description	Color	Operator With 1 N.O. and 1 N.C. Contact (KA1)	Operator With 1 N.O. Contact (KA2)	Operator With 1 N.C. Contact (KA3)	Operator Only With No Contacts ⑤
Full Guard	Black	KR1BH13	KR1BH5	KR1BH6	KR1B
	Red	KR1RH13	KR1RH5	KR1RH6	KR1R
	Green	KR1GH13	KR1GH5	KR1GH6	KR1G
	Universal ①	KR1UH13	KR1UH5	KR1UH6	KR1U
	Other ②	KR1②H13	KR1②H5	KR1②H6	KR1②
No Guard	Black	KR3BH13	KR3BH5	KR3BH6	KR3B
	Red	KR3RH13	KR3RH5	KR3RH6	KR3R
	Green	KR3GH13	KR3GH5	KR3GH6	KR3G
	Universal ①	KR3UH13	KR3UH5	KR3UH6	KR3U
	Other ②	KR3②H13	KR3②H5	KR3②H6	KR3②
Extended Guard	Black	KR2BH13	KR2BH5	KR2BH6	KR2B
	Red	KR2RH13	KR2RH5	KR2RH6	KR2R
	Green	KR2GH13	KR2GH5	KR2GH6	KR2G
	Universal ①	KR2UH13	KR2UH5	KR2UH6	KR2U
	Other ②	KR2②H13	KR2②H5	KR2②H6	KR2②
$1\frac{3}{8}$" Diameter Mushroom Button	**Snap-In Mushroom Button**				
	Black	KR4BH13	KR4BH5	KR4BH6	KR4B
	Red	KR4RH13	KR4RH5	KR4RH6	KR4R
	Red ③	KR4R05H13	KR4R05H5	KR4R05H6	KR4R05
	Green	KR4GH13	KR4GH5	KR4GH6	KR4G
	Other ④	KR4④H13	KR4④H5	KR4④H6	KR4④
	Screw-On Mushroom Button With Set Screw Security				
	Black	KR24BH13	KR24BH5	KR24BH6	KR24B
	Red	KR24RH13	KR24RH5	KR24RH6	KR24R
	Green	KR24GH13	KR24GH5	KR24GH6	KR24G
	Other ④	KR24④H13	KR24④H5	KR24④H6	KR24④
 $2\frac{1}{4}$" Diameter Mushroom Button	**Snap-In Mushroom Button**				
	Black	KR5BH13	KR5BH5	KR5BH6	KR5B
	Red	KR5RH13	KR5RH5	KR5RH6	KR5R
	Red ③	KR5R05H13	KR5R05H5	KR5R05H6	KR5R05
	Green	KR5GH13	KR5GH5	KR5GH6	KR5G
	Other ④	KR5④H13	KR5④H5	KR5④H6	KR5④
	Screw-On Mushroom Button With Set Screw Security				
	Black	KR25BH13	KR25BH5	KR25BH6	KR25B
	Red	KR25RH13	KR25RH5	KR25RH6	KR25R
	Green	KR25GH13	KR25GH5	KR25GH6	KR25G
	Other ④	KR25④H13	KR25④H5	KR25④H6	KR25④

① The universal push button operators contain one each of the following color inserts: black, red, green, yellow, orange, blue and white.
② See table below.
③ Knob has the words "Emergency Stop" in raised letters highlighted in white for readability. Available in red snap-in mushroom buttons only.
④ See table below.
⑤ These operators can be ordered complete with contact blocks – for maximum block usage – see page 155. Add the "H" number chosen from page 151 to the end of the operator type number.
EXAMPLE: KR24B + H2(2 - KA1) = KR24BH2

Color	② For KR1, 2, 3 Choose Color and Place Code in Type Number	④ For KR4, 5, 24, 25 Choose Color and Place Color Code in Type Number
Blue	L	L
Yellow	Y	Y
White	W	–
Orange	S	S
Gray	E	–

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Non-Illuminated Momentary Push Button Operators – UL Types 4, 4X, 13/NEMA Types 4, 4X, 13

For use in hazardous locations – See page 150.
Contact Blocks And Legend Plate Not Included Unless Otherwise Noted

Description	Color	Operator With 1 N.O. and 1 N.C. Contact (KA1)	Operator With (KA2)	Operator With 1 N.C. Contact (KA3)	Operator Only With No Contacts ⑤
Full Guard	Black	SKR1BH13	SKR1BH5	SKR1BH6	SKR1B
	Red	SKR1RH13	SKR1RH5	SKR1RH6	SKR1R
	Green	SKR1GH13	SKR1GH5	SKR1GH6	SKR1G
	Universal ①	SKR1UH13	SKR1UH5	SKR1UH6	SKR1U
	Other ②	SKR1②H13	SKR1②H5	SKR1②H6	SKR1②
No Guard	Black	SKR3BH13	SKR3BH5	SKR3BH6	SKR3B
	Red	SKR3RH13	SKR3RH5	SKR3RH6	SKR3R
	Green	SKR3GH13	SKR3GH5	SKR3GH6	SKR3G
	Universal ①	SKR3UH13	SKR3UH5	SKR3UH6	SKR3U
	Other ②	SKR3②H13	SKR3②H5	SKR3②H6	SKR3②
Extended Guard	Black	SKR2BH13	SKR2BH5	SKR2BH6	SKR2B
	Red	SKR2RH13	SKR2RH5	SKR2RH6	SKR2R
	Green	SKR2GH13	SKR2GH5	SKR2GH6	SKR2G
	Universal ①	SKR2UH13	SKR2UH5	SKR2UH6	SKR2U
	Other ②	SKR2②	SKR2②H5	SKR2②H6	SKR2②
$1^3/_8$ Mushroom Button	**Snap In Mushroom Button**				
	Black	SKR4BH13	SKR4BH5	SKR4BH6	SKR4B
	Red	SKR4RH13	SKR4RH5	SKR4RH6	SKR4R
	Red ③	SKR4R05H13	SKR4R05H5	SKR4R05H6	SKR4R05
	Green	SKR4GH13	SKR4GH5	SKR4GH6	SKR4G
	Other ④	SKR4④H13	SKR4④H5	SKR4④H6	SKR4④
	Screw-On Mushroom Button With Set Screw Security				
	Black	SKR24BH13	SKR24BH5	SKR24BH6	SKR24B
	Red	SKR24RH13	SKR24RH5	SKR24RH6	SKR24R
	Green	SKR24GH13	SKR24GH5	SKR24GH6	SKR24G
	Other ④	SKR24④H13	SKR24④H5	SKR24④H6	SKR24④
$2^1/_4$ Mushroom Button	**Snap-In Mushroom Button**				
	Black	SKR5BH13	SKR5BH5	SKR5BH6	SKR5B
	Red	SKR5RH13	SKR5RH5	SKR5RH6	SKR5R
	Red ③	SKR5R05H13	SKR5R05H5	SKR5R05H6	SKR5R05
	Green	SKR5GH13	SKR5GH5	SKR5GH6	SKR5G
	Other ④	SKR5④H13	SKR5④H5	SKR5④H6	SKR5④
	Screw-On Mushroom Button With Set Screw Security				
	Black	SKR25BH13	SKR25BH5	SKR25BH6	SKR25B
	Red	SKR25RH13	SKR25RH5	SKR25RH6	SKR25R
	Green	SKR25GH13	SKR25GH5	SKR25GH6	SKR25G
	Other ④	SKR25④H13	SKR25④H5	SKR25④H6	SKR25④

① The universal push button operators include one each of the following color inserts: black, red, green, yellow, orange, blue and white.
② See table below.
③ Knob has the words "Emergency Stop" in raised letters highlighted in white for readability. Available in red snap-in mushroom buttons only.
④ See table below.
⑤ These operators can be ordered complete with contact blocks, for maximum block usage – see page 155. Add the "H" number chosen from page 151 to the end of the operator type number. **EXAMPLE: SKR24B + H2(2-KA1) = SKR24BH2**

Color	② For SKR1,2,3 Choose Color and Place Color Code in Type Number	④ For SKR4,5,24,25 Choose Color and Place Color Code in Type Number
Blue	L	L
Yellow	Y	Y
White	W	–
Orange	S	S
Gray	E	·

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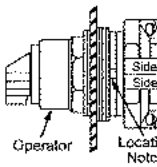
Push Buttons and Operator Interface Specifiers Guide
Class 9001, Type SK — 30 mm
Corrosion Resistant Selector Switches

Non-Illuminated 3 Position Selector Switch Operators – UL Types 4, 4X, 13/NEMA Types 4, 4X, 13

For use in hazardous locations – See page 150. Legend Plate and Contact Block Not Included Unless Noted

CONTACT BLOCK REQUIRED			1 — Contact Closed 0 — Contact Open								
Contact Block Position	Quantity and Type	Mount on Side	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right	Center Left Right
	KA1 OR KA3	KA1 #2 OR KA3 #2	1 0 0	1 0 0	0 0 1	1 0 0	1 0 0	1 0 0	1 0 0	0 1 0	1 1 0
	KA1 OR KA2	KA1 #2 OR KA2 #2	0 1 1	0 0 1	0 1 0	0 1 0	0 0 1	0 1 1	0 1 1	1 0 0	0 0 1
	KA1 OR KA3	KA1 #1 OR KA3 #1	0 0 1	1 0 0	0 0 1	1 0 0	0 1 0	0 0 1	1 0 1	0 0 1	0 1 1
	KA1 OR KA2	KA1 #1 OR KA2 #1	1 1 0	0 0 1	0 1 0	0 1 0	0 0 1	1 0 0	0 1 0	0 1 0	1 0 0
CAM			B	C	D	E	F	G	J	L	M
Non-Illuminated Operators			Type	Type	Type	Type	Type	Type	Type	Type	Type
Manual Return	Operator Only①	Without Knob With Standard Black Knob With Other Color Knob (See Table)②	SKS42 SKS42B SKS42②	SKS43 SKS43B SKS43②	SKS44 SKS44B SKS44②	SKS45 SKS45B SKS45②	SKS46 SKS46B SKS46②	SKS47 SKS47B SKS47②	SKS49 SKS49B SKS49②	SKS401 SKS401B SKS401②	SKS402 SKS402B SKS402②
	With Contact Block(s)	With Standard Black Knob (See Table for Other Colors, Replace B in Type No. with Color Code) With 1 KA1 on side #2 (H13) With 1 KA1 on side #1 (H1) With 1 KA1 on side #1 and 1 KA1 on side #2 (H2)	SKS42BH13 SKS42BH1 SKS42BH2	SKS43BH13 SKS43BH1 SKS43BH2	SKS44BH13 SKS44BH1 SKS44BH2	SKS45BH13 SKS45BH1 SKS45BH2	SKS46BH13 SKS46BH1 SKS46BH2	SKS47BH13 SKS47BH1 SKS47BH2	SKS49BH13 SKS49BH1 SKS49BH2	SKS401BH13 SKS401BH1 SKS401BH2	SKS402BH13 SKS402BH1 SKS402BH2
Spring Return from Left to Center	Operator Only①	Without Knob With Standard Black Knob With Other Color Knob (See Table)②	SKS62 SKS62B SKS62②	SKS63 SKS63B SKS63②	SKS64 SKS64B SKS64②	SKS65 SKS65B SKS65②	SKS66 SKS66B SKS66②	SKS67 SKS67B SKS67②	SKS69 SKS69B SKS69②	SKS601 SKS601B SKS601②	SKS602 SKS602B SKS602②
Spring Return From Right to Center	Operator Only①	Without Knob With Standard Black Knob With Other Color Knob (See Table)②	SKS72 SKS72B SKS72②	SKS73 SKS73B SKS73②	SKS74 SKS74B SKS74②	SKS75 SKS75B SKS75②	SKS76 SKS76B SKS76②	SKS77 SKS77B SKS77②	SKS79 SKS79B SKS79②	SKS701 SKS701B SKS701②	SKS702 SKS702B SKS702②
Spring Return Both Sides to Center	Operator Only①	Without Knob With Standard Black Knob With Other Color Knob (See Table)②	SKS52 SKS52B SKS52②	SKS53 SKS53B SKS53②	SKS54 SKS54B SKS54②	SKS55 SKS55B SKS55②	SKS56 SKS56B SKS56②	SKS57 SKS57B SKS57②	SKS59 SKS59B SKS59②	SKS501 SKS501B SKS501②	SKS502 SKS502B SKS502②

① These operators can be ordered complete with contact blocks, for maximum block usage – see page 155. Add the "H" number chosen from page 151 to the end of the operator type number.
EXAMPLE: SKS43FB+H13(KA1-POS 2) = SKS43FBH13.

② Add the color code as chosen from knob color table below.
EXAMPLE: SKS43② with a green gloved hand knob = SKS43FG.

Selector Switch Knobs

Color	Standard Knob ② Knob Code	Standard Knob Type	Gloved Hand Knob ② Knob Code	Gloved Hand Knob Type	Coin Operated ② Knob Code	Coin Operated Type
Black	B	B11	FB	B25	TB	B18
Red	R	R8	FR	R24	TR	R16
Green	G	G8	FG	G24	TG	G16
Yellow	Y	Y8	FY	Y24	TY	Y16
Orange	S	S11	FS	S25	–	–
Blue	L	L8	FL	L24	TL	L16
White	W	W8	FW	W24	–	–
Amber	A	A8	FA	A24	–	–
Clear	C	C8	FC	C24	TC	C16

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Door-Mounted Operating Mechanisms for Square D Circuit Breakers

Class 9421

Type L Circuit Breaker Mechanisms

Type L door mounted, variable depth operating mechanisms feature heavy duty, all metal construction with trip indication. All can be padlocked in the "OFF" position when the enclosure door is open. Further, the handle assemblies can be locked "OFF" with up to three padlocks, which also locks the door closed. (The 3" handle accepts one padlock.)

Complete Kits

Complete kits are rated for NEMA Type 1, 3R and 12 enclosures, and a door-drilling template is supplied to ease installation. They include a handle assembly, operating mechanism, and shaft assembly

Complete Kit Does Not Include Circuit Breaker			Includes: Operating Mechanism Standard 6" Handle Standard Shaft Kit		Includes: Operating Mechanism Standard 6" Handle Long Shaft Kit		Includes: Operating Mechanism Short 3" Handle Long Shaft Kit	
Use With								
Circuit Breaker or Interrupter Type	Number of Poles	Frame Size (Amps)	Type	Mounting Depth▲ Min.-Max.	Type	Mounting Depth▲ Min.-Max.	Type	Mounting Depth▲ Min.-Max.
GJL	3	75, 100	LG1	$5^3/_2$-$10^1/_4$	LG4	$5^1/_2$–$20^7/_8$	LG3	$5^1/_2$–$20^7/_8$
FAL, FCL, FHL	2–3	100	LN1	$5^3/_2$–$10^7/_{16}$	LN4	$5^1/_2$-21	LN3	$5^1/_2$-21
KAL, KCL, KHL	2–3	250	LP1	$6^3/_4$–$11^3/_{16}$	LP4	$6^3/_4$–$21^3/_4$	LP3	$6^3/_4$-$21^3/_4$
LAL, LHL, QAL	2–3	400	LR1	$6^5/_{16}$–$10^7/_8$	LR4	$6^5/_{16}$–$21^1/_2$	3" handles are not recommended for use with these circuit breakers.	
MEL, MXL	2–3	800	LT1*	$7^3/_{16}$–$11^5/_8$	LT4*	$7^3/_{16}$–$22^1/_4$		
MAL, MHL	2–3	1000	LT1*	$7^3/_{16}$–$11^5/_8$	LT4*	$7^3/_{16}$–$22^1/_4$		
NAL, NCL, NEL, NXL	2–3	1200	LX1*	$8^3/_4$–$12^3/_4$	LX4*	$8^3/_4$–$23^3/_8$		

▲ Mounting depth measured from circuit breaker mounting surface (control panel) to outside of enclosure door in inches.
* Types LT1, LT4, LX1, and LX4 include an 8" handle rather than a 6" handle.

Component Parts

Component parts kits are rated for NEMA Type 1, 3, 3R, 4, 4X, and 12 enclosures. All handle assemblies are painted (the handle is flat black and the base ring is silver).

Use With			3" Handle Assemblies Type 1, 3R, 12	Standard Handle Assemblies Type 1, 3R, 12	Operating Mechanism Includes Lockout	Standard Shaft (Support Bracket Not Required)		Long Shaft (Support Bracket Included)	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (Amps)	Type	Type	Type	Mounting Depth♦ Min.–Max.	Type	Mounting Depth♦ Min.–Max.	Type
GJL	3	75, 100	LH3	LH5	LG7	$5^1/_2$–$10^7/_{16}$	LS8	5½–21	LS13
FAL, FCL, FHL	2–3	100	LH3	LH6	LN1	$5^1/_2$–$10^7/_{16}$	LS8	5½–21	LS12
KAL, KCL, KHL	2–3	250	LH3	LH6	LX1	$8^3/_4$–$11^3/_{16}$	LS8	$6^3/_4$–$21^3/_4$	LS12
LAL, LHL, QAL	2–3	400	3" handles are not recommended for use with these circuit breakers.	LH6	LL1	$6^5/_{16}$–$10^7/_8$	LS8	$6^5/_{16}$–$21^1/_2$	LS10
MEL, MXL	2–3	800		LH9	LM1	$7^3/_{16}$–$11^5/_8$	LS8	$7^3/_{16}$–$22^1/_4$	LS10
MAL, MHL	2–3	1000		LH8	LM1	$7^3/_{16}$–$11^5/_8$	LS8	$7^3/_{16}$–$22^1/_4$	LS10
NAL, NCL, NEL, NXL	2–3	1200		LH8	LX7	$8^3/_4$–$12^3/_4$	LS8	$8^3/_4$–$23^3/_8$	LS10

♦ Mounting depth measured from circuit breaker mounting surface (control panel) to outside of enclosure door in inches.

NEMA Type 3 and 4 Handle Assemblies*

Use With			Standard Handle Assemblies		Special 3" Version	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (Amps)	NEMA Type 3, 4 (Painted)	NEMA Type 3, 4, 4X (Chrome Plated)	NEMA Type 3, 4 (Painted)	NEMA Type 3, 4, 4X (Chrome Plated)
			Type	Type	Type	Type
GJL	3	75	LH46	LC46	LH43	LC43
FAL, FCL, FHL	2–3	100	LH46	LC46	LH43	LC43
KAL, KCL, KHL	2–3	250	LH46	LC46	LH43	LC43
LAL, LHL, QAL	2–3	400	LH46	LC46	3" handles are not recommended for use with these circuit breakers.	
MEL, MXL	2–3	800	LH48	LC46		
MAL, MHL	2–3	1000	LH48	LC48		
NAL, NCL, NEL, NXL	2–3	1200	LH48	LC48		

* Due to gasketing, NEMA Type 3 & 4 handle assemblies are NOT trip indicating.

IEC Style Operating Mechanisms

Circuit Breaker or Interrupter Type	Type 1, 4, 4X, 12		Operating Mechanism includes lockout	Extension Shafts		
	Color	Type	Type	Mounting Depth Min.	Mounting Depth Max.	Type
GJL	Red/Yellow	NW4	LG8	$6^1/_8$	$10^3/_4$	NS46
	Black	NW4B		$6^1/_8$	$17^7/_8$	NS446▼

▼ Contains support bracket.

Electrical Interlock Kits—Class 9999

(optional accessory for use with 9421L operating mechanisms)

Description	Class	Type
Single Pole Double Throw	9999	R47
Double Pole Double Throw	9999	R48

Note: Not used with GJL, NAL, NCL, NEL, or NXL; use field-installable circuit breaker interlocks instead.

3" Handle Assembly

Standard Handle

Operating Mechanism (includes lockout)

IEC-Style Handle (9421NW4B)

IEC Extension Shaft (9421NS46)

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3" Handle Assembly

Class 9421 Type L Circuit Breaker Mechanisms

Type L door-mounted, variable-depth operating mechanisms feature heavy duty, all metal construction with trip indication. All can be padlocked in the "OFF" position when the enclosure door is open. Further, the handle assemblies can be locked "OFF" with up to three padlocks, which also locks the door closed. (The 3" handle accepts one padlock.)

Complete Kits

Complete kits are rated for NEMA Type 1, 3R and 12 enclosures, and a door-drilling template is supplied to ease installation. They include a handle assembly, operating mechanism, and shaft assembly.

Standard Handle Assembly

Complete Kit Does Not Include Circuit Breaker. Use With			Includes: Operating Mechanism Standard 6" Handle Standard Shaft Kit		Includes: Operating Mechanism Standard 6" Handle Long Shaft Kit		Includes: Operating Mechanism Short 3" Handle Long Shaft Kit	
Circuit Breaker or Interrupter Type	Number of Poles	Frame Size (A)	Type	Mounting Depth▲ Min.-Max.	Type	Mounting Depth▲ Min.-Max.	Type	Mounting Depth▲ Min.-Max.
GJL	3	75, 100	LG1	$5^1/_2$-$10^1/_4$	LG4	$5^1/_2$-$20^7/_8$	LG3	$5^1/_2$-$20^7/_8$
FAL, FCL, FHL	2-3	100	LN1	$5^1/_2$-$10^7/_{16}$	LN4	$5^1/_2$-21	LN3	$5^1/_2$-21
KAL, KCL, KHL	2-3	250	LP1	$6^1/_4$-$11^3/_{16}$	LP4	$6^1/_4$-$21^3/_4$	LP3	$6^1/_4$-$21^3/_4$
LAL, LHL, Q4L	2-3	400	LR1	$6^5/_{16}$-$10^7/_8$	LR4	$6^5/_{16}$-$21^1/_2$	3" handles are not recommended for use with these circuit breakers.	
MEL, MXL	2-3	800	LT1†	$7^3/_{16}$-$11^5/_8$	LT4†	$7^3/_{16}$-$22^1/_4$		
MAL, MHL	2-3	1000	LT1†	$7^3/_{16}$-$11^5/_8$	LT4†	$7^3/_{16}$-$22^1/_4$		
NAL, NCL, NEL, NXL	2-3	1200	LX1†	$8^1/_4$-$12^3/_4$	LX4†	$8^1/_4$-$23^3/_8$		

▲ Mounting depth measured from circuit breaker mounting surface (control panel) to outside of enclosure door in inches.
† Types LT1, LT4, LX1, and LX4 include an 8" handle rather than a 6" handle.

Component Parts

Component parts kits are rated for NEMA Type 1, 3, 3R, 4, 4X, and 12 enclosures. All handle assemblies are painted (the handle is flat black and the base ring is silver).

Operating Mechanism (includes lockout)

Use With			3" Handle Assemblies Type 1, 3R, 12	Std. Handle Assemblies Type 1, 3R, 12	Operating Mechanism Includes Lockout	Standard Shaft (Support Bracket Not Required)		Long Shaft (Support Bracket Included)	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (Amps)	Type	Type	Type	Mounting Depth■ Min.-Max.	Type	Mounting Depth■ Min.-Max.	Type
GJL	3	75 100	LH3	LH6	LG7	$5^1/_2$-$10^7/_{16}$	LS8	$5^1/_2$-21	LS12
FAL, FCL, FHL	2-3	100	LH3	LH6	LF1	$5^1/_2$-$10^7/_{16}$	LS8	$5^1/_2$-21	LS12
KAL, KCL, KHL	2-3	250	LH3	LH6	LK1	$6^1/_4$-$11^3/_{16}$	LS8	$6^1/_4$-$21^3/_4$	LS12
LAL, LHL, Q4L	2-3	400	3" handles are not recommended for use with these circuit breakers.	LH6	LL1	$6^5/_{16}$-$10^7/_8$	LS8	$6^5/_{16}$-$21^1/_2$	LS10
MEL, MXL	2-3	800		LH8	LM1	$7^3/_{16}$-$11^5/_8$	LS8	$7^3/_{16}$-$22^1/_4$	LS10
MAL, MHL	2-3	1000		LH8	LM1	$7^3/_{16}$-$11^5/_8$	LS8	$7^3/_{16}$-$22^1/_4$	LS10
NAL, NCL, NEL, NXL	2-3	1200		LH8	LX7	$8^1/_4$-$12^3/_4$	LS8	$8^1/_4$-$23^3/_8$	LS10

■ Mounting depth measured from circuit breaker mounting surface (control panel) to outside of enclosure door in inches.

IEC-Style Handle (for use with 9421LG8, see page 11)

NEMA Type 3 and 4 Handle Assemblies*

Use With			Standard Handle Assemblies		Special 3" Version	
Circuit Breaker or Interrupter Type	No. of Poles	Frame Size (Amps)	NEMA Type 3, 4 (Painted) Type	NEMA Type 3, 4, 4X (Chrome Plated) Type	NEMA Type 3, 4 (Painted) Type	NEMA Type 3, 4, 4X (Chrome Plated) Type
GJL	3	75	LH46	LC46	LH43	LC43
FAL, FCL, FHL	2-3	100	LH46	LC46	LH43	LC43
KAL, KCL, KHL	2-3	250	LH46	LC46	LH43	LC43
LAL, LHL, Q4L	2-3	400	LH46	LC46	3" handles are not recommended for use with these circuit breakers.	
MEL, MXL	2-3	800	LH48	LC48		
MAL, MHL	2-3	1000	LH48	LC48		
NAL, NCL, NEL, NXL	2-3	1200	LH48	LC48		

* Due to gasketing, NEMA Type 3 & 4 handle assemblies are NOT trip indicating.

File E62922
CCN: DIHS2

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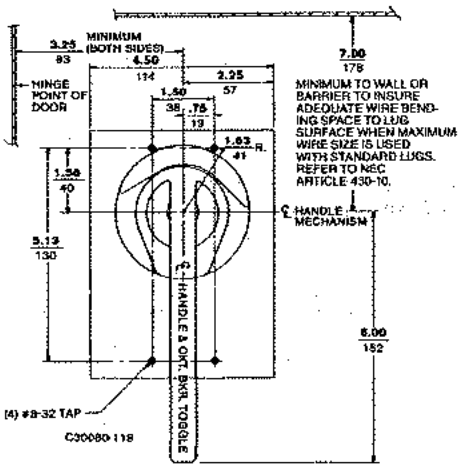
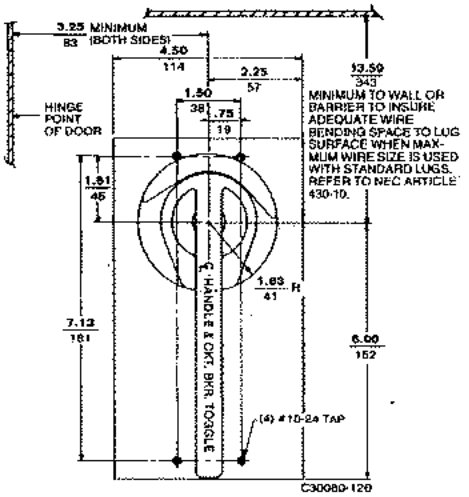
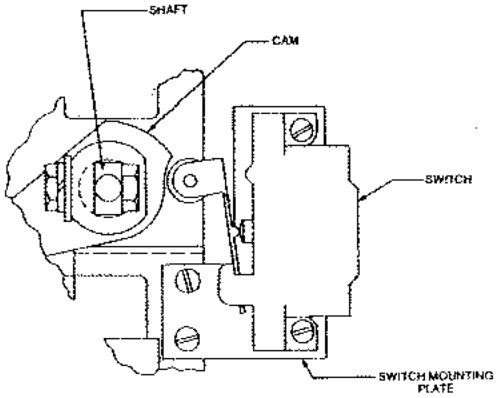


Panel Drilling for FAL, FCL, FHL
Circuit Breakers and Operating Mechanisms

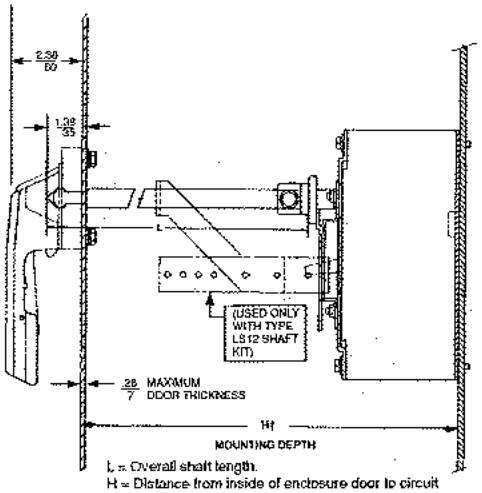


Panel Drilling for KAL, KCL, KHL
Circuit Breakers and Operating Mechanisms



Electrical Interlock Location – FA, KA

Dimensions for FAL, FCL, FHL, KAL, KCL, KHL Circuit Breakers and Circuit Interrupters



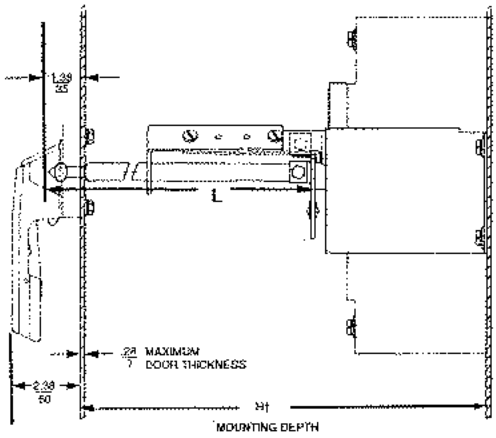
L = Overall shaft length.
H = Distance from inside of enclosure door to circuit breaker mounting surface.

Determination of Shaft Length

Class	Type	Shaft Length Formula	Standard Shaft		Long Shaft	
			Min	Max	Min.	Max.
9421	LF1, LN1, LN3, LN4	L = H – 2.88 (73)	5.5 (140)	10.44 (265)	5.5 (140)	21.00 (533)
	LK1, LP1, LP3, LP4	L = H – 3.63 (92)	6.25 (159)	11.19 (284)	6.25 (159)	21.75 (552)

† Mounting depth measured from circuit breaker mounting surface (control panel) to outside of enclosure door.

Dimensions for LAL, LHL, Q4L Circuit Breakers and Circuit Interrupters



L = Overall shaft length.
H = Distance from inside of enclosure door to circuit breaker mounting surface.

Determination of Shaft Length

Class	Type	Shaft Length Formula	Standard Shaft		Long Shaft	
			Min	Max	Min.	Max.
9421	LL1, LR1, LR4	L = H – 3.13 (79)	6.31 (160)	10.88 (276)	6.31 (160)	21.50 (546)

† Mounting depth measured from circuit breaker mounting surface (control panel) to outside of enclosure door.

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Thermal-magnetic Molded Case Circuit Breakers

100 Ampere Frame
Class 650

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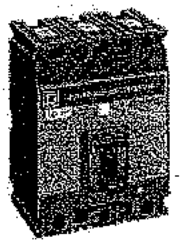
Thermal-magnetic molded case circuit breakers shown on pages 6-20–6-24 are permanent trip UL Listed, CSA Certified, IEC rated, and also meet the requirements of Federal Specification W–C–375B/GEN as indicated on pages 6-4–6-7. For I-LINE® molded case circuit breakers, see listings on pages 8-25–8-28.

FAL
1-pole
15–100 Amperes

FAL/FHL
2-pole
15–100 Amperes



FAL/FHL/FCL
3-pole
15–100 Amperes

Interrupting Ratings (kA)

	FAL240	FAL480	FCL
240 V	10	18 (1P), 25 (2, 3P)	100
480 V	...	18	65
600 V	...	...	...

Circuit Breaker Termination Options

(Third character of catalog number)

F=No Lugs
L=Lugs both ends
M=Lugs "ON" end only
P=Lugs "OFF" end only

F-frame—100 A, Thermal-magnetic (240 Vac)

Continuous Current Rating @ 40° C	AC Magnetic Trip Settings		Standard Interrupting	Terminal Wire Range
	Hold	Trip	Catalog Number	
1-pole, 120 Vac				
15	275	600	FAL12015	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al
20	275	600	FAL12020	
25	275	600	FAL12025	
30	275	600	FAL12030	
35	400	850	FAL12035	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al
40	400	850	FAL12040	
45	400	850	FAL12045	
50	400	850	FAL12050	
60	800	1450	FAL12060	
70	800	1450	FAL12070	
80	800	1450	FAL12080	
90	900	1700	FAL12090	
100	900	1700	FAL12100	
2-pole, 240 Vac				
15	275	600	FAL22015	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al
20	275	600	FAL22020	
25	275	600	FAL22025	
30	275	600	FAL22030	
35	400	850	FAL22035	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al
40	400	850	FAL22040	
45	400	850	FAL22045	
50	400	850	FAL22050	
60	800	1450	FAL22060	
70	800	1450	FAL22070	
80	800	1450	FAL22080	
90	900	1700	FAL22090	
100	900	1700	FAL22100	
3-pole, 240 Vac				
15	275	600	FAL32015	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al
20	275	600	FAL32020	
25	275	600	FAL32025	
30	275	600	FAL32030	
35	400	850	FAL32035	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al
40	400	850	FAL32040	
45	400	850	FAL32045	
50	400	850	FAL32050	
60	800	1450	FAL32060	
70	800	1450	FAL32070	
80	800	1450	FAL32080	
90	900	1700	FAL32090	
100	900	1700	FAL32100	

F-frame—100 A, Thermal-magnetic (480 Vac)

Continuous Current Rating @ 40° C	AC Magnetic Trip Settings		Standard Interrupting	Extra High Interrupting	Terminal Wire Range	
	Hold	Trip	Catalog Number	Catalog Number	FA Lugs	FC Lugs
1-pole, 277 Vac, 125 Vdc						
15	275	600	FAL14015	...	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al	...
20	275	600	FAL14020	...		
25	275	600	FAL14025	...		
30	275	600	FAL14030	...		
35	400	850	FAL14035	...	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al	...
40	400	850	FAL14040	...		
45	400	850	FAL14045	...		
50	400	850	FAL14050	...		
60	800	1450	FAL14060	...		
70	800	1450	FAL14070	...		
80	800	1450	FAL14080	...		
90	900	1700	FAL14090	...		
100	900	1700	FAL14100	...		
2-pole, 480 Vac, 250 Vdc▪▲						
15	275	600	FAL24015	FCL24015	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al	CU30FA4 (1) #14–#10 AWG Cu only
20	275	600	FAL24020	FCL24020		
25	275	600	FAL24025	FCL24025		
30	275	600	FAL24030	FCL24030		
35	400	850	FAL24035	FCL24035	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al	AL100FA4 (1) #14–#3 AWG Cu or (1) #12–#1 AWG Al
40	400	850	FAL24040	FCL24040		
45	400	850	FAL24045	FCL24045		
50	400	850	FAL24050	FCL24050		
60	800	1450	FAL24060	FCL24060		
70	800	1450	FAL24070	FCL24070		
80	800	1450	FAL24080	FCL24080		
90	900	1700	FAL24090	FCL24090		
100	900	1700	FAL24100	FCL24100		
3-pole, 480 Vac, 250 Vdc▪						
15	275	600	FAL34015	FCL34015	AL50FA #14–#4 AWG Cu or #12–#4 AWG Al	CU30FA4 (1) #14–#10 AWG Cu only
20	275	600	FAL34020	FCL34020		
25	275	600	FAL34025	FCL34025		
30	275	600	FAL34030	FCL34030		
35	400	850	FAL34035	FCL34035	AL100FA #14–#1/0 AWG Cu or #12–#1/0 AWG Al	AL100FA4 (1) #14–#3 AWG Cu or (1) #12–#1 AWG Al
40	400	850	FAL34040	FCL34040		
45	400	850	FAL34045	FCL34045		
50	400	850	FAL34050	FCL34050		
60	800	1450	FAL34060	FCL34060		
70	800	1450	FAL34070	FCL34070		
80	800	1450	FAL34080	FCL34080		
90	900	1700	FAL34090	FCL34090		
100	900	1700	FAL34100	FCL34100		

▲ FCL 2-pole circuit breaker built using 3-pole module.
▪ FCL circuit breakers are not rated for 250 Vdc.

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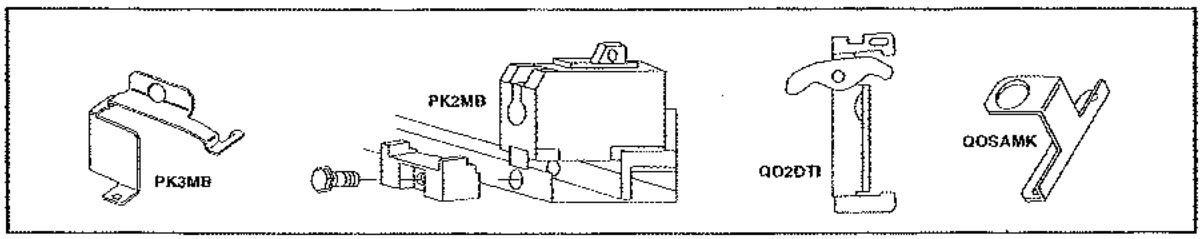
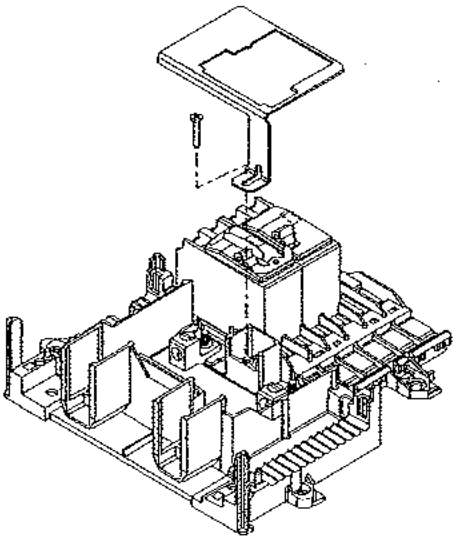
QO® Load Centers
Accessories
Class 1130

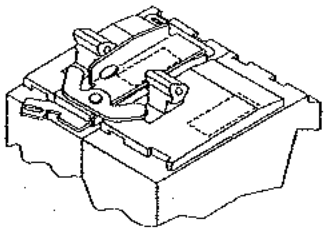
QO Load Center Accessories

	Description	Catalog Number
Retaining Kit	Secures circuit breaker to interior when used as a back-fed main. For QO612L100F/S, RB, QO612L100DF/S, QO816L100F/S, RB, QO816L100DF/S and QO148L125GF/S, GRB load centers	PK2MB
	Secures circuit breaker to interior when used as a back-fed main. For 3Ø Load Centers	PK3MB
	Secures circuit breaker to interior when used as a back-fed main for 2-pole QO 150–200 A circuit breakers	PK5RK
	Secures ONE circuit breaker with or without electrical accessories to right side of interior when used as a back-fed main. For 1Ø 100–125 ampere convertible main load centers, Series S01 and S02	PK4MB2LA
	Secures ONE circuit breaker with or without electrical accessories to right side of interior when used as a back-fed main. For 1Ø 150–225 ampere convertible main load centers, Series S01 and S02	PK4MB2HA
Manual Transfer Equipment Kit	For interlocking the handles of two 2-pole or one 2-pole and one 1-pole QO and Q1 circuit breakers mounted side-by-side so that only one circuit breaker can be "ON" at a time	QO2DTI
	QO2DTI mechanical interlock attachment with retaining kits for securing two adjacent back-fed circuit breakers in dual power supply applications. Can be used with (2) 2-poles or (1) 2-pole and (1) 1-pole QO circuit breakers in QO816L100 load centers	QO2DTIM
	Secures TWO 2-pole circuit breakers to right side of interior when used as back-fed mains, a QO2DTI Kit included for back-up power supply applications. For 1Ø 100–125 ampere convertible main load centers, Series S01 and S02	PK4DTIM4LA
	Secures TWO 2-pole circuit breakers to right side of interior when used as back-fed mains, a QO2DTI Kit included for back-up power supply applications. For 1Ø 150–225 ampere convertible main load centers, Series S01 and S02	PK4DTIM4HA
	Secures TWO 2-pole circuit breakers to left side of interior when used as back-fed mains, a QO2DTI Kit included for back-up power supply applications. For 1Ø 100–125 ampere convertible main load centers, Series S01 and S02	PK4DTIM4LAL
Generator Circuit Breaker Interlock Kit	NEMA 1 (Indoor): Interlocks a QOM2 2-pole main circuit breaker of a load center (150–225 A) with a QO 2-pole (15–125 A) branch circuit breaker. Includes a retaining kit	QOCGK2
	NEMA 3R (Outdoor): Interlocks a QOM2 2-pole main circuit breaker of a load center (150–225 A) with a QO 2-pole (15–125 A) branch circuit breaker. Includes a retaining kit	QORBGK2
Miscellaneous		
Cover Sealing Strap:	Provides means of sealing trim mounting screws on QO load center covers	QO1SE
Surge Arresters:	For use on 1Ø3W, 150 Vac maximum.	SDSA1175
	For use on 3Ø4W, 650 Vac maximum.	SDSA3650
	QO SURGEBREAKER cULus Listed Secondary Surge Arrester 150 Vac line-to-ground maximum.	QO2175SB
	HOMELINE SURGEBREAKER cULus Listed Secondary Surge Arrester 150 Vac line-to-ground maximum.	HOM2175SB
Surge Arrester Mounting Kit:	UL Listed for mounting SDSA1175 surge arrester into ground bar mounting holes on 1Ø convertible main circuit breaker load centers	QOSAMK

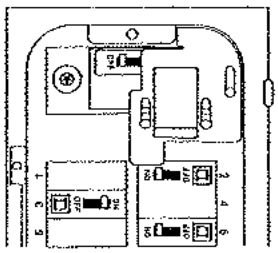




PK4DTIM4HA



QO2DTI Installed



QOCGK2 Installed

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QO® Circuit Breakers
with VISI-TRIP® Indicator
Class 730, 731, 733

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For the most up-to-date information

QO 1-pole

1 Space Required

QOT 1-pole Tandem

1 Space Required

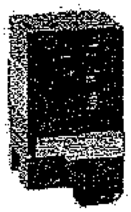
QO 2-pole

2 Spaces Required

QO Three-pole

3 Spaces Required

QO2200 2-pole 200 A



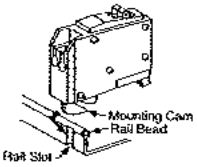
4 Spaces Required

QO/QOB Ring Terminal (20% Price Adder)—Factory-installed Only

Ampere Rating	Poles	Suffix
10–30	1, 2, 3	5237
35–60	1,2	5238
35–50	3	
70–110	2	5273
60–100	3	

Circuit Breaker Wire Sizes▲

Breaker Type	Ampere Rating	Wire Size (AWG) Al	Wire Size (AWG) Cu
QO 1-pole	10–30	#14–8	#14–8
	10–30	...	(2) #14–10
	35–70	#8–2	#8–2
QO 2-pole	10–30	#14–8	#14–8
	10–30	...	(2) #14–10
	35–70	#8–2	#8–2
	80–125	#4–2/0	#4–2/0
	150–200	#4–300 kcmil	#4–300 kcmil
QO 3-pole	10–30	#14–8	#14–8
	35–70	#8–2	#8–2
	80–125	#4–2/0	#4–2/0
QOB-VH	110–150	#4–300 kcmil	#4–300 kcmil
QOT	15–20	#12–8	#14–8
QO-AFI, QO-GFI & QO-EPD	15–30 40, 50, 60	#12–8 #12–4	#14–8 #14–6
QO-PL	10–60	#12–2	#14–2



Circuit Limiting QOT Tandem Breakers
QOT tandem breakers have a mounting cam as shown. Installation into a QO load center can only be made in those positions having a mounting pan rail slot. Meets Par. 408.15 of NEC®, UL Listed as Class CTL.

QO Miniature Circuit Breakers

SQUARE D QO miniature circuit breakers are plug-on products for use in QO load centers, NQOD panelboards, NQOD OEM interiors or SPEED-D® switchboard distribution panels. Bolt-on QOB circuit breakers are for use in NQOD panelboards or interiors.▽

Plug-On Circuit Breakers—UL Listed Amperes Interrupting Rating (AIR) in Amperes RMS Symmetrical

Amperes Rating▲	1-pole—120/240 Vac Catalog Number	2-pole—120/240 Vac Common Trip Catalog Number	2-pole—240 Vac■ Common Trip Catalog Number	Three-pole—240 Vac Common Trip Catalog Number
10,000 AIR				
10	QO110	QO210	...	QO310
15	QO115♦★	QO215♦	QO215H	QO315♦
20	QO120♦★	QO220♦	QO220H	QO320♦
25	QO125♦	QO225♦	QO225H	QO325♦
30	QO130♦	QO230♦	QO230H	QO330♦
35	QO135♦	QO235♦	...	QO335♦
40	QO140♦	QO240♦	QO240H	QO340♦
45	QO145♦	QO245♦	...	QO345♦
50	QO150♦	QO250♦	QO250H	QO350♦
60	QO160♦	QO260♦	QO260H	QO360♦
70	QO170♦	QO270♦	QO270H	QO370♦
80	...	QO280♦	QO280H	QO380♦
90	...	QO290♦	QO290H	QO390♦
100	...	QO2100♦	QO2100H	QO3100♦
110	...	QO2110♦	...	...
125	...	QO2125♦	...	...
150	...	QO2150♦▼	...	...
175	...	QO2175♦▼	...	...
200	...	QO2200♦▼	...	...
Molded Case Switch 60 A max.–240 Vac		...	QO200	QO300
Molded Case Switch 100 A max.–240 Vac		...	QO2000△	QO3000△
22,000 AIR				
15	QO115VH♦★	QO215VH□♦	...	QO315VH□♦
20	QO120VH♦★	QO220VH□♦	...	QO320VH□♦
25	QO125VH♦	QO225VH□♦	...	QO325VH□♦
30	QO130VH♦	QO230VH□♦	...	QO330VH□♦
40	...	QO240VH□♦	...	QO340VH□♦
50	...	QO250VH□♦	...	QO350VH□♦
60	...	QO260VH□♦	...	QO360VH□♦
70	...	QO270VH□♦	...	QO370VH□♦
80	...	QO280VH□♦	...	QO380VH□♦
90	...	QO290VH□♦	...	QO390VH□♦
100	...	QO2100VH□♦	...	QO3100VH□♦
110	...	QO2110VH□◊♦	...	...
125	...	QO2125VH□◊♦	...	...
150	...	QO2150VH□♦▼	...	...
175	...	QO2175VH□♦▼	...	...
200	...	QO2200VH□♦▼	...	...
42,000 AIR				
40	...	QOH240♦△	...	...
45	...	QOH245♦△	...	...
50	...	QOH250♦△	...	...
60	...	QOH260♦△	...	...
70	...	QOH270♦	...	...
80	...	QOH280♦	...	...
90	...	QOH290♦	...	...
100	...	QOH2100♦	...	...
110	...	QOH2110♦△	...	...
125	...	QOH2125♦	...	...
65,000 AIR				
15	QH115♦★	QH215♦	...	QH315♦
20	QH120♦★	QH220♦	...	QH320♦
25	QH125♦△	QH225♦△	...	QH325♦△
30	QH130♦	QH230♦	...	QH330♦

QOT Tandem Circuit Breakers—10,000 AIR

Ampere Rating▲	1-pole Tandem 120/240 Vac Catalog No.	2-pole Tandem 120/240 Vac Catalog No.
15 & 15	QOT1515♦	Order two QOT1515 or QOT2020 circuit breakers and handle tie Cat. No. QOTHT at $2.50 for common switching of center two poles.
15 & 20	QOT1520♦	
20 & 20	QOT2020♦	

Replacement Tandem Breakers

For Use in Old Style Non-Class CTL QO Load Centers—10,000 AIR

Ampere Rating▲	1-pole—120/240 Vac 1 Space Required Catalog No.	Two Single-pole Individual Trip 120/240 Vac 2 Spaces Required Catalog No.
10	....	Order Two QO1515 or QO2020 circuit breakers and handle tie Cat. # QOTHT
15 & 15	QO1515♦	
15 & 20	QO1520♦	
20 & 20	QO2020♦	
20 & 30	QO2030♦	.... QO20303020♦
30 & 20	QO3020♦	....
30 & 30	QO3030♦	....

▲ 10–30 A circuit breakers are suitable for use with 60°C or 75°C conductors. 35–125 A circuit breakers are suitable for use with 75°C conductors.
■ UL Listed 5000 AIR on corner grounded Delta systems.
♦ UL Listed as HACR type for use with air conditioning, heating and refrigeration equipment having motor group combinations and marked for use with HACR type circuit breakers.
★ UL Listed as SWD (switching duty) rated. Suitable for switching 120 Vac fluorescent lighting loads.
▼ Requires four spaces (#1–300 kcmil Al/Cu). Not suitable for use in 3-phase panel. Use only in single phase panel rated 150 A or greater.
△ Order only. Contact your nearest Square D/Schneider Electric sales office.
□ UL Listed for use ahead of QO, QO-GFI, QO-EPD, QOT, and QO-PL 10,000 AIR circuit breakers to permit their application at 22,000 A fault level.
◊ 100 A maximum branch mounted opposite.
♣ Includes two circuit breakers (one QO2030 and one QO3020) and handle tie QOTHT.
▽ See Digest Section 1 for load centers, and Section 8 for panelboards and interiors.

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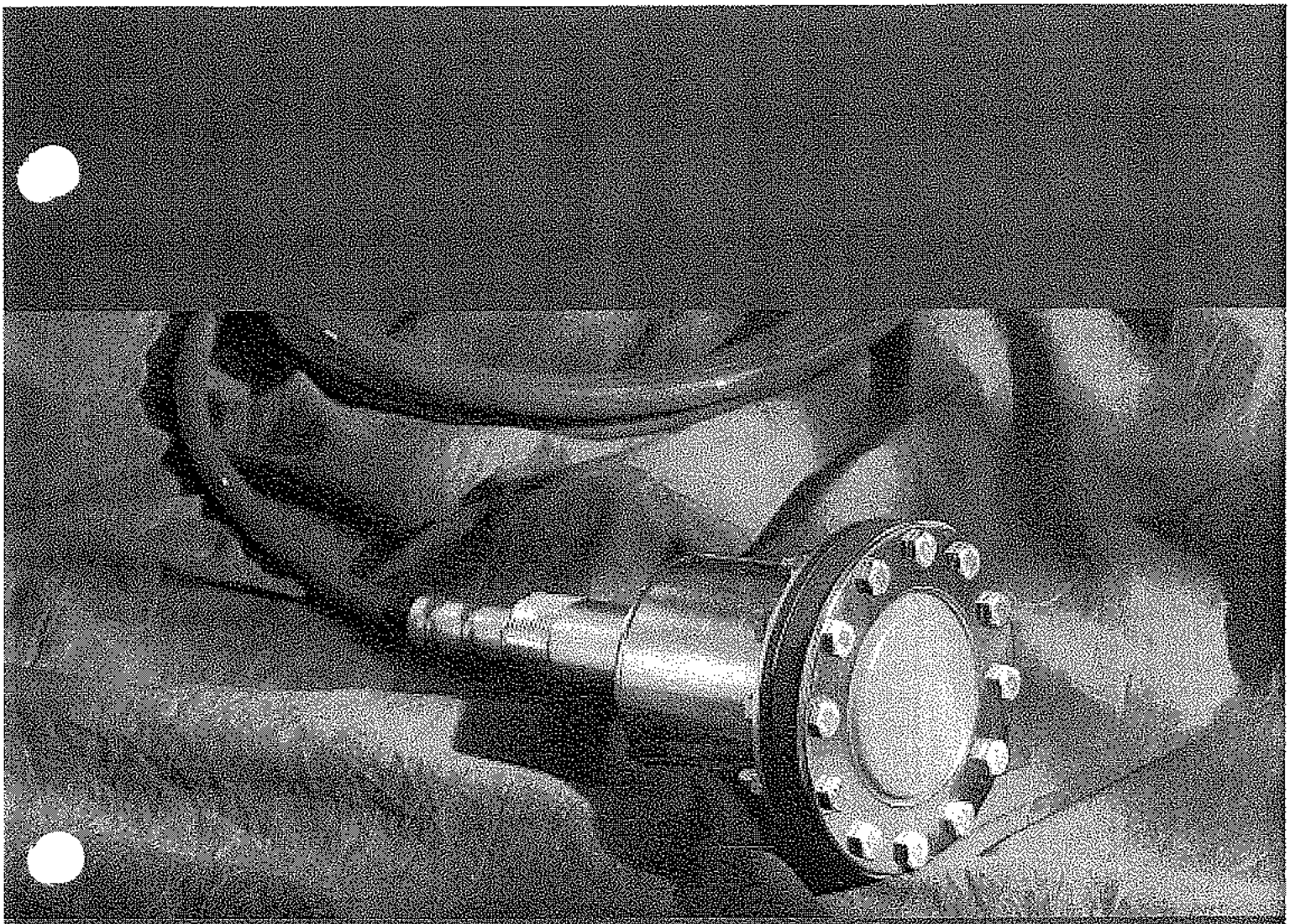
9/8/03

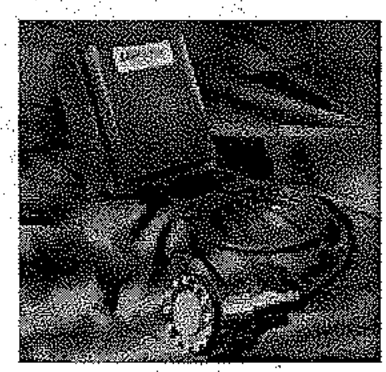


USFilter

A1000 SUBMERSIBLE LEVEL TRANSDUCER: PROVEN PERFORMANCE IN HIGH-SOLIDS ENVIRONMENTS.

US-CS-PDF No. 1920 Rev. 1.01

A1000 SUBMERSIBLE LEVEL TRANSDUCER



A1000 Features In Brief

- *316 stainless steel construction with PVC and Buna-N isolation rings and 2-5/8" Teflon®-coated or Viton® coated Buna-N diaphragm.*
- *Easy-to-run 1/2" cable with integral breather tube.*
- *Sealed breather system.*
- *Analog output.*
- *Provides 1-5 VDC or 4-20 mADC outputs.*
- *Pressure range: 0-1, 0-5, 0-15, 0-30, 0-75, 0-150, 0-300 PSI.*
- *Factory-calibrated, with field recalibration available.*
- *Available in several standard cable lengths. Custom lengths up to 1000' available by special order.*
- *Intrinsically safe when used with optional IS1 Intrinsic Safety Barrier.*
- *Electronics are electrically isolated from sensed media.*

Teflon is a registered trademark of DuPont.

The A1000/157GSC Submersible Level Transducer/Transmitter is a proven performer in high-solids environments, including sewage lift station wet wells and sludge sumps. It is equally effective in clean water level monitoring applications. The submersible system's rugged simplicity eliminates the cost, clogging and complexity of other types of level sensing.

The A1000 senses liquid level excursions over a factory-calibrated, customer-specified range. It provides a signal to telemeter or record liquid level, or to sense flow rate in flumes, weirs and rivers.

Calibrated to the specific gravity of the liquid in which it operates, the transducer measures the head-pressure imposed on its bottom diaphragm face by the height of the liquid above it and translates the information into an electronic signal.

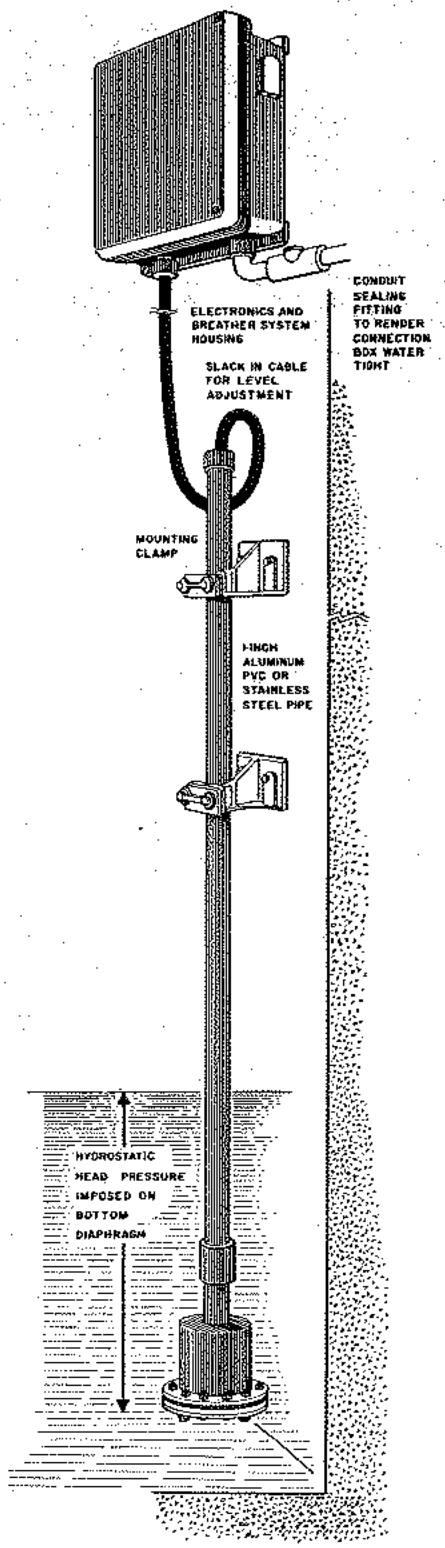
The 2-5/8" diameter Teflon-faced or Viton-faced diaphragm and state-of-the-art precision pressure transducer mechanism are located in the lower assembly. Mounted at a fixed, submerged level, the lower assembly has a type 316 stainless steel body.

The enclosed upper assembly houses system signal conditioning, protective electronics, the job connections terminal block, and the expansion bag of the sealed breathing system, a vital system which negates the effects of changes in atmospheric pressure and protects the sensor from environmental contaminants.

The connecting cable between the upper and lower assemblies has a 1/2" polyurethane jacket, a 3-conductor shielded AWG #16 cable, and an integral rigid breather tube that is part of the sealed breathing system.

Advantages of the system include:

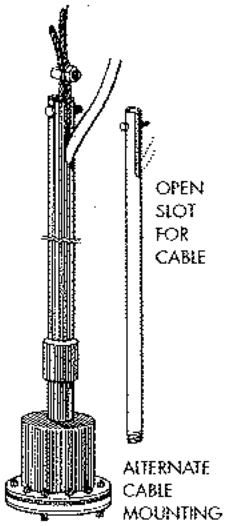
- Solid-state electronics for accuracy, reliability and economy.
- Little or no maintenance required.
- Sealed breathing system that protects electronics from corrosive gases.
- Rigid breather tube that cannot be pinched as a result of installation, assuring barometric compensation.
- Integral transient protection.
- High proof pressure that allows system to withstand inadvertently excessive pressures on the sensing element.
- Seven pressure ranges (spannable down to 15% of element range).
- Easy field repair with stock parts.
- Field calibration possible in most applications.
- Many options are available, including level indication, special housing and environmental conditioning equipment.



The lower assembly is generally either pipe-mounted (1" NPT) or suspended with a stainless steel cable in a vertical position in the sump or reservoir to be sensed. Although it can be specified and furnished for any other mounting attitude, cable mounting is recommended for easiest serviceability.

The sensed media can be any type compatible with the lower assembly and cable materials (316 stainless steel, Teflon, PVC, Nitrile and urethane), but it must be of a constant specific gravity.

CABLE SUSPENSION MOUNTING KIT

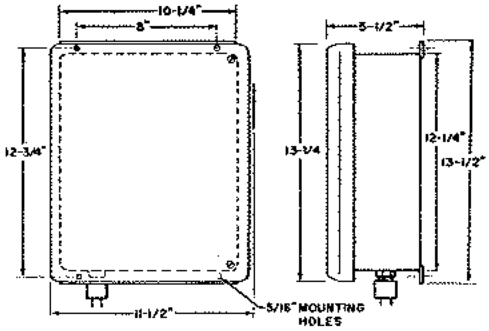


Kit includes 2' long 1-inch NPT Type 316 SS pipe with coupling, bolt, cable clamps and other hardware shown
P/N 601418-01

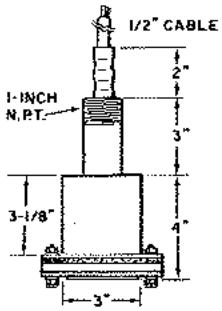
1/8-inch diameter, 7x19 SS cable; order the desired number of feet. Clamps are in Kit
P/N 601440-XX

Cable mounting is the preferred method for ease of serviceability

UPPER ASSEMBLY DIMENSIONS



LOWER ASSEMBLY DIMENSIONS



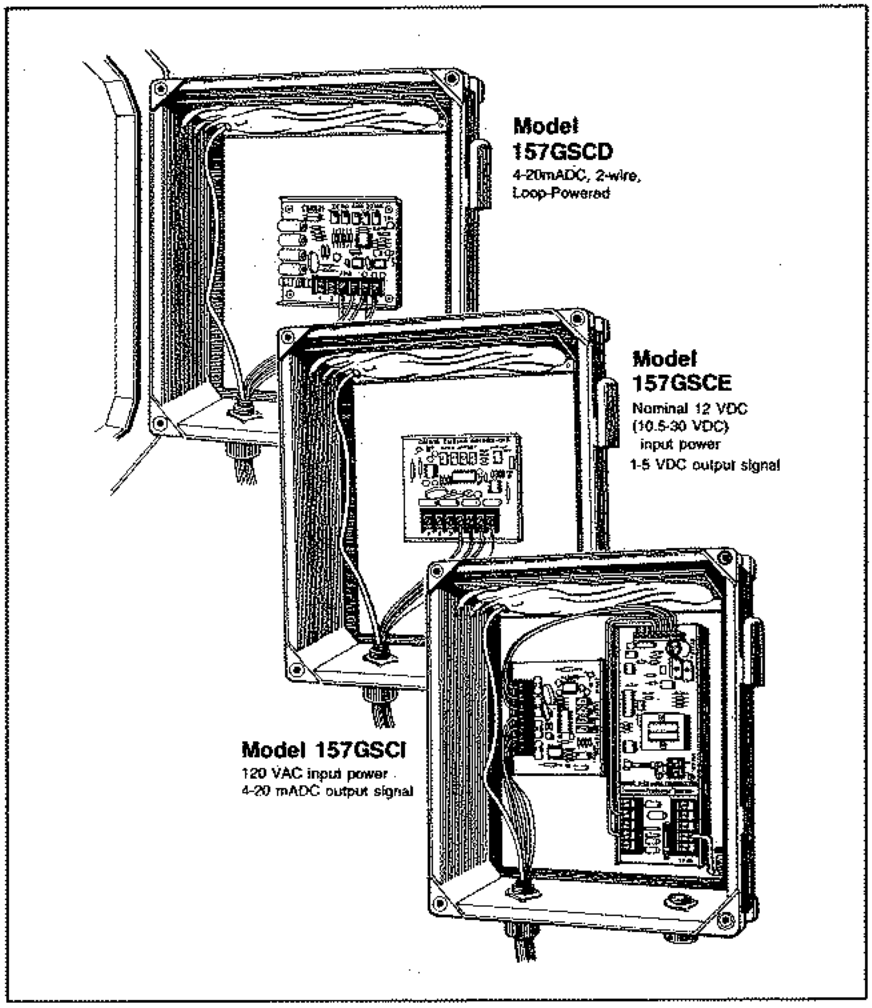
TOP VIEW

PRESSURE RANGE TABLE				
PRESSURE RANGE	RANGES PSIG	PRESSURE/LEVELS FT./WATER	PRESSURE/LEVELS IN./WATER	MAX. PRESS. PSIG
1.0	0 to 1	2.31	27.72	20
5.0	0 to 5	11.55	138.6	50
15.0	0 to 15	34.65	416.0	150
30.0	0 to 30	69.3	832.0	150
75.0	0 to 75	173.25	2079.0	150
150.0	0 to 150	346.5	4158.0	225

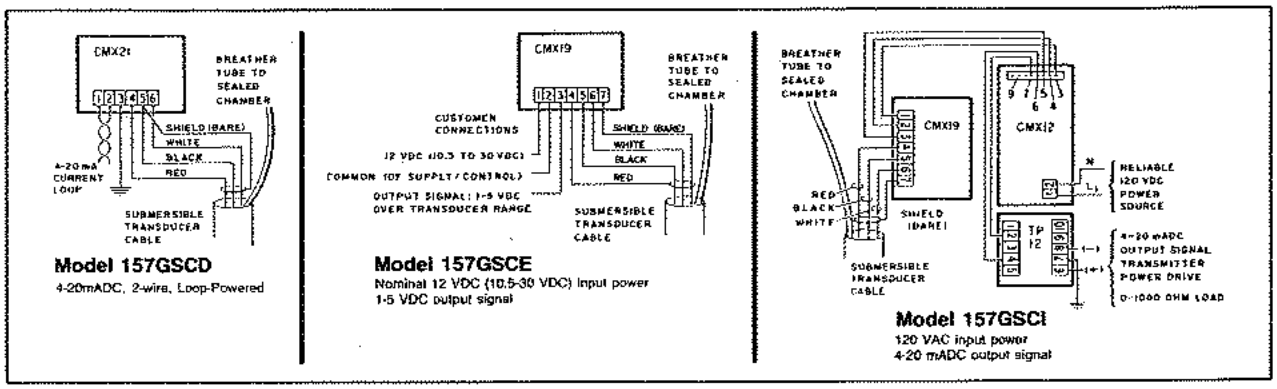
The Pressure Range Table shows maximum full-scale ratings of the six standard elements. Note the high proof pressures shown. Each range can be furnished with a "Feet-of-Water" calibration to any desired value from the maximum shown to as little as 15% of that figure.

THREE MODELS TO MATCH YOUR

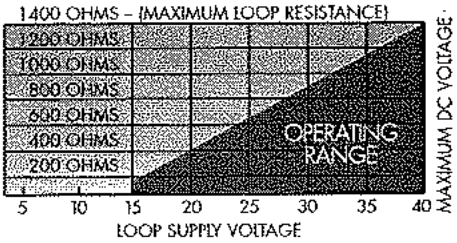
ELECTRICAL SPECIFICATIONS



ELECTRICAL CONNECTIONS



Model 157GSCD
Loop-powered, 4-20 mADC, 2-wire. Requires from 16 to 40 VDC loop power to drive up to a 0-1400 ohm resistive load (meter, controller, circuit resistance, etc.). See the Table for loop power/load driving relationships. Transient protection is provided, including a 3-element gas tube arrestor.



Model 157GSCE
12 VDC-powered unit provides a precise 1-5 VDC output signal capable of driving a 100 ohm or higher resistance load. Supply voltage variations are accommodated over a 10.5 to 30 VDC range; with a 30 mADC maximum current draw. This model is well-suited to battery operation. Varistor/resistor/diode transient protection is provided.

Model 157GSCI
120 VAC-powered with a 10 VA current draw. Provides a 4-20 mADC output signal to drive a 0 to 1000 ohm resistive load. Signal output loop is powered by this unit at approximately 33 VDC. This model includes a Manual Mode Switch and Pot as well as a 0-1 mA or 0-1.999 VDC attenuable drive circuit for an optional digital panel meter or related control. Transient protection is provided on both the 120 VAC power and the 4-20 mADC output signal circuits.

STANDARD OPTIONS

USFilter Control Systems products can be customized to meet your requirements. Many options are available. Please talk to your USF Control Systems representative for recommendations and price quotes.

Choose A Stainless Steel Upper Assembly.
The housing of the upper assembly is furnished in Type 304 welded stainless steel under this option. The front door is hinged and gasketed. Nominal dimensions are generally similar to the basic molded polyester housing.

Directly Connect The A1000 To A Pipe Or Vessel By Converting It To An A3000.
Convert the A1000 submersible level transducer into a submersible pressure transducer that can be mounted on a pipe or vessel, giving the application the convenience of a standard gauge-type pressure transducer with the survivability of a submersible. Used extensively in valve vaults that may occasionally be flooded due to environmental conditions. Standard connections include 3/4" and 2" female NPT.

Increase Safety To Your System By Adding An Intrinsic Safety Barrier.
The A1000 submersible level transducer system is rendered intrinsically safe through the use of an IS1 barrier. See page 9 of this brochure for further information regarding the use of IS1 barriers.

Add Convenience And Serviceability With A Digital Panel Meter.
The A1000 submersible level transducer upper electronics assembly is provided with a 3.5 digit LCD level readout.

Improve Reliability In Damp Environments With Thermostatically Controlled Condensation Protection.
The A1000 submersible level transducer upper electronics assembly is provided with an integral heater and high temperature cut-out thermoswitch to protect internal electronics from damage due to condensation.

SUGGESTED SPECIFICATIONS

For Model 157GSCD
The liquid level of the _____ shall be sensed by a USFilter Control Systems Bulletin A1000, Model 157GSCD Submersible Level Transducer. The transducer shall be a 4-20 mADC, 2-wire, 16 to 40 VDC loop-powered type with its output signal directly proportional to the measured level excursion over a factory-calibrated range of zero to ___ feet of water.

For Model 157GSCE
The liquid level of the _____ shall be sensed by a USFilter Control Systems Bulletin A1000, Model 157GSCE Submersible Level Transducer. The transducer shall be a 3-wire type to operate from a supply voltage of 10.5 to 30 VDC and produce a 1-5 VDC instrumentation signal in direct proportion to the measured level excursion over a factory-calibrated range of zero to ___ feet of water.

For Model 157GSCI
The liquid level of the _____ shall be sensed by a USFilter Control Systems Bulletin A1000, Model 157GSCI Submersible Level Transducer. The transducer shall be a 4-wire type to operate on 120 VAC incoming power and produce a 4-20 mADC instrumentation signal into a 0-1,000 ohm load in direct proportion to the measured level excursion over a factory-calibrated range of zero to ___ feet of water.

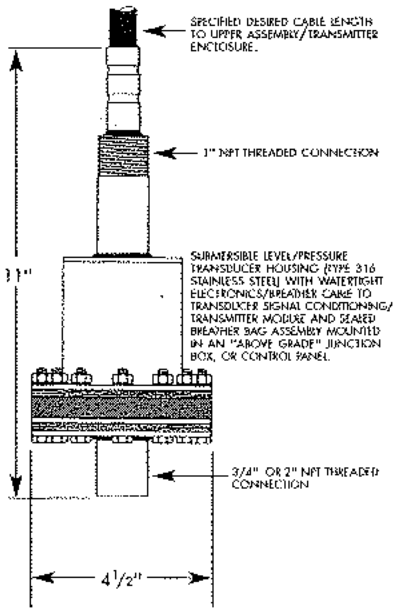
For All Models
The Transducer shall be of the solid-state head-pressure sensing type, suitable for continuous submergence and operation and shall be installed in accordance with manufacturer's instructions. The bottom diaphragm face of the sensor shall be installed (recommend 6") _____ inches above the floor at elevation _____. The sensor shall be mounted in a location and as shown on the job plans.

The transducer housing shall be fabricated of type 316 stainless steel with a bottom diaphragm 2-5/8" diameter of heavy-duty, limp, foul-free, molded Teflon bonded to a synthetic rubber back/seal.

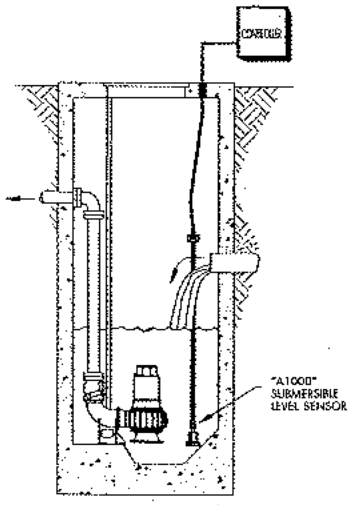
A hydraulic fill liquid behind the diaphragm shall transmit the sensed pressure to a solid-state variable-capacitance transducer element to convert the sensed pressure to a corresponding electrical value. The sensed media shall exert its pressure against the diaphragm which flexes minutely so as to vary the proximity between an internal ceramic diaphragm and a ceramic substrate to vary the capacitance of an electrical field created between the two surfaces. A stable, hybrid, operational amplifier assembly shall be incorporated in the transducer to excite and demodulate the sensing mechanism. The transducer shall incorporate laser-trimmed temperature compensation and high-quality components and construction to provide a precise, reliable, stable output signal directly proportional to the sensed pressure over a factory-calibrated range.

The transducer element shall incorporate high over-pressure protection and be designed to withstand intermittent over-pressures five times the full scale range being sensed. Metallic diaphragms shall not be acceptable in that they are subject to damage or distortion. Sensing principles employing LVDTs, resistive or pneumatic elements shall not be acceptable.

The transducer/transmitter shall include easily accessible offset and span adjustments in the upper assembly. Span shall be adjustable from 100% down to 15% of the sensor range. Fine and coarse adjustments for both span and offset shall be



A3000



Sewage or Stormwater Wet Well

provided, using 25-turn potentiometers. Offset and span adjustments shall be non-interactive, for ease of calibration.

The internal pressure of the lower transducer assembly shall be relieved to atmospheric pressure through a heavy-duty urethane jacketed hose/cable assembly with rigid breather tube and a slack PVC bellows mounted in the NEMA 3X fiberglass upper assembly. The sealed breather system shall compensate for variations in barometric pressure and expansion and contraction of air due to temperature changes and altitude as well as prevent fouling from moisture and other corrosive elements.

The transducer assembly shall be installed where directed by the Engineer and connected with other system elements and placed in successful operation. It shall be provided with input power and output signal transient protection, associated control elements as specified herein and in accordance with manufacturer's instructions.

SUGGESTED SPECIFICATIONS *(CONTINUED)*

– MOUNTING METHODS (SELECT ONE)

A. 1" Pipe Mounting Clamps

The sensor shall be mounted using a vertical 1" pipe (supplied by the contractor) and secured in place by USFilter Control Systems Model 9GCL3 Type 304 stainless steel mounting clamps or equivalent.

B. Cable Suspension Mounting Kit

The sensor shall be suspension-mounted using a USFilter Control Systems cable suspension mounting kit or equivalent, consisting of a 2' long 1-inch NPT Type 316 stainless steel pipe with coupling, bolt, cable clamps and hardware along with the required length of 1/8 inch diameter 7 x 19 stainless steel cable.

SUGGESTED SPECIFICATIONS *(CONTINUED)*

– OPTIONS

Safe Wiring Barrier

Provide an intrinsically safe barrier between the upper and lower assemblies (or ahead of the entire transducer in the case of the 157GSCD). The barrier shall render the level sensing system suitable for use in Class 1, Division 1, Groups A, B, C and D, Class 2, Division 1, Groups E, F and G, and Class 3, Division 1 hazardous locations.

Digital Indicating Meter (LCD)

Furnish a 3.5 digit digital panel meter with a .5" high numeric LCD display calibrated in "feet and tenths of a foot," "inches of water" or other engineering units as desired. The meter shall provide a 0-1999 count range produced by a 4-20 mADC signal. Lesser values shall be produced by an attenuated signal. Mount on the front hinged door of the upper assembly with a weatherproof clear polycarbonate cover over the meter.

Condensation-Protective Heater/Thermostat

Furnish a 120 VAC powered resistor heater element and a sealed thermostat to keep the internal temperature of the upper assembly above the dew point to prevent problems associated with condensation.

Type of Transducer
Hydrostatic head-pressure-sensing type mounted at a fixed elevation in an open (vented to atmosphere) sump or tank.

The height of water above the bottom diaphragm imposes a pressure on the bottom limp interface diaphragm. This pressure is transmitted by an internal oil fill to a gauge pressure type variable-capacitance transducer which converts the pressure to a directly proportional electrical signal. The power supply to the transducer is supplied and regulated by an electronics assembly in the upper housing which also accepts the output signal of the lower assembly transducer and provides spanning and offsetting as well as transient protection and job connections.

Basic Function
Converts water level excursions over a calibrated range to corresponding proportional electronic process control signal.

Pressure Ranges
See Pressure Range Table, page 3.

Pressure Overload
See Pressure Range Table, page 3.

Span Adjustments
Coarse and fine. From 100% to 15% of range. Non-interactive with offset adjustments. NOTE: Span is the algebraic difference between zero level and the full-scale calibrated range of the transducer.

Offset Adjustments
Coarse and fine. From 0 to 75% of range. Non-interactive with span adjustments.

Accuracy
±0.3% best straight line of full span. This typical value includes combined effects of linearity, hysteresis and repeatability.

Temperature Range
Storage: -20 to +80 degrees C (-4 to +176 degrees F). Operation: 0 to +70 degrees C (+32 to +158 degrees F).

Temperature Error
Less than 1/2 of 1% span over a 0 to 50 degrees C (+32 to +122 degrees F) range.

Relative Humidity
0-95%, non-condensing.

Stability over 1 year (typical)
±1/2 of 1% of full span.

Job Connections
Clamp type barriers terminals for AWG #14-22.

Media Compatibility
Any media compatible with #316 SS, PVC, Teflon, synthetic rubber and urethane and with a specific gravity of 1.0 or other constant. Refer special requirements to the factory.

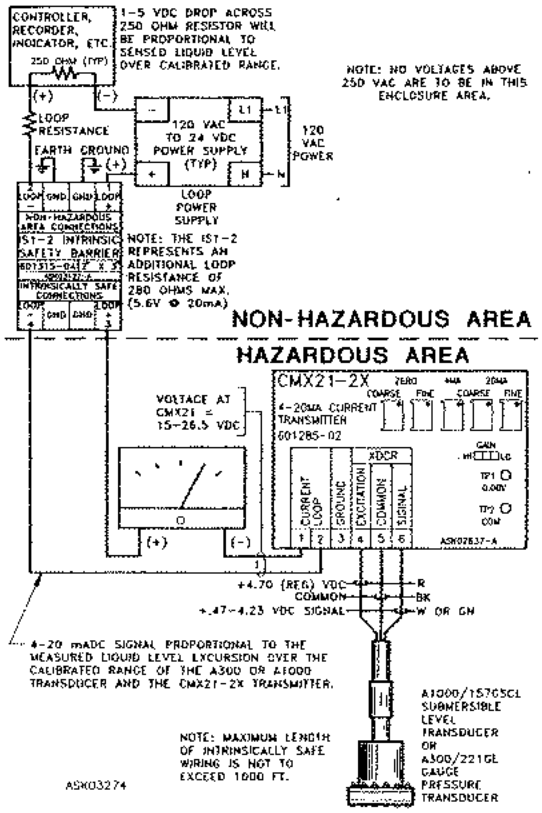
Mounting Attitude
The A1000 is factory-calibrated as a standard for use in the vertical position. It can be furnished calibrated for operation in any other desired attitude.

Repairable
All key parts of this transducer/transmitter can be repaired or replaced at the Factory. Easily field repaired.

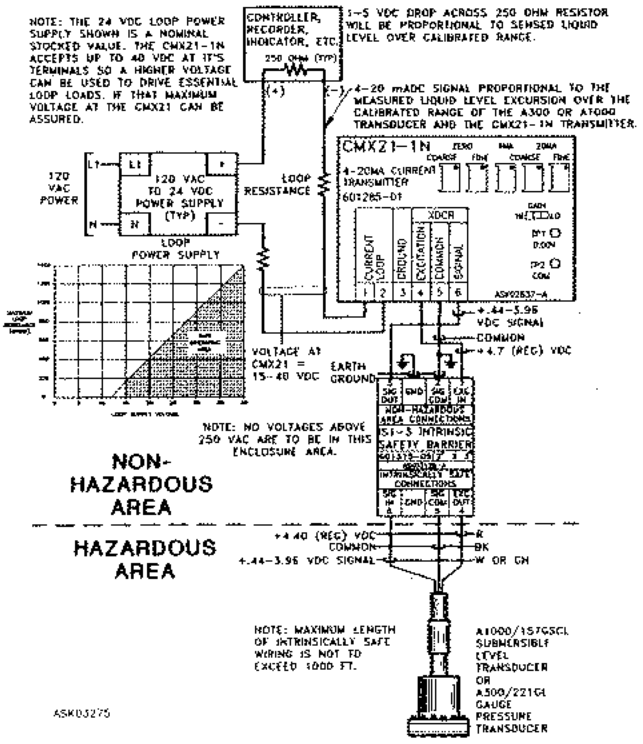
IS1 Features In Brief

- *Analog signal Zener shunt-diode barrier.*
- *UL-recognized, Class 1, Division 1, Group D barrier.*

The IS1-2 (2-wire) and IS1-3 (3-wire) Intrinsic Safety Barriers are used to provide isolation between a single analog transmitter located in a hazardous environment and the control panel, which is mounted in a non-hazardous area. The safety barrier provides "intrinsically safe" characteristics for the remotely mounted transducer equipment and associated circuitry installed in the defined hazardous location. The IS1 barriers are ideally suited for use in UL #913 applications. Part numbers for the safety barriers are listed with the mounting hardware options.



Drawing A – The IS1-2 Barrier is used to provide intrinsically-safe characteristics for an A1000 (Model 157GSCD), CMX21-2X Current Transmitter, and Analog Meter. In this case, the entire system is U.L.-listed for operation within hazardous locations.



Drawing B – The IS1-3 is used to provide intrinsically-safe characteristics for the lower portion of the A1000 (Models 157GSCE and 157GSCI) when they use the CMX21-1N Current Transmitter in the non-hazardous area.

MODEL SELECTION GUIDE

Order by Model Number, according to the following template, or by Part Number, according to the chart on the next page.

A _ _ _ _ – 157 GSC _ – _ _ _ – _ _ _ – _ _ _ _ – _ _ _ (_ _)–(_ _)–(_ _)

Bulletin # | Model # Upper Assembly | Specific Gravity | Press. Range | Calibration Range (Ft.) | Cable Length | Opt. 1 | Opt. 2 | Opt. 3

BULLETIN	LOWER ASSEMBLY TYPE	UPPER ASS'Y TYPE D	E	I	L
A1000	2-5/8" exposed Teflon diaphragm	X	X	X	X
A3000	NPT port adaptor diaphragm cover – 3/4"	X	X	X	X
A3000	NPT port adaptor diaphragm cover – 2.0"	X	X	X	X
MODEL	**PRODUCT DESCRIPTION**				
157GSC	Submersible level transducer	X	X	X	X
CODE	**UPPER ASSEMBLY**				
D	Power supply: 16-40 VDC, loop-powered, 2-wire type				
	Outlet signal: 4-20 mADC	X			
E	Power supply: 12 VDC, 3-wire type				
	Outlet signal: 1-5 VDC		X		
I	Power supply: 120 VAC, 4-wire type				
	Outlet signal: 4-20 mADC			X	
L[1]	No upper assembly. Power supply: Regulated 6.25 VDC, 3-wire type				
	Output signal: 0-5 VDC not scaled				X
CODE	**SPECIFIC GRAVITY OF SENSED MEDIA**				
1.0	Water	X	X	X	
n.n[2]	Enter specific gravity for fluid other than water	X	X	X	
CODE	**PRESSURE RANGE**				
1.0	0-1 PSIG, 2.31 ft. water, 20 PSIG maximum pressure	X	X	X	X
5.0	0-5 PSIG, 11.55 ft. water, 50 PSIG maximum pressure	X	X	X	X
15.0	0-15 PSIG, 34.65 ft. water, 150 PSIG maximum pressure	X	X	X	X
30.0	0-30 PSIG, 69.3 ft. water, 150 PSIG maximum pressure	X	X	X	X
75.0	0-75 PSIG, 173.25 ft. water, 150 PSIG maximum pressure	X	X	X	X
150.0	0-150 PSIG, 346.5 ft. water, 225 PSIG maximum pressure	X	X	X	X
300.0	0-300 PSIG, 693 ft. water, 300 PSIG maximum pressure	X	X	X	X
CODE	**CALIBRATION RANGE**				
nn[3]	Factory calibrated range in "Feet-of-water"	X	X	X	
CODE	**CABLE LENGTH**[4]				
20	20 feet	X	X	X	X
30	30 feet	X	X	X	X
40	40 feet	X	X	X	X
60	60 feet	X	X	X	X
nn	Custom length, contact factory	X	X	X	X
CODE	**OPTIONS**				
01	3.5 digit LCD display w/viewing window	X	X	X	
02	Condensation protection heater and thermoswitch, 25W	X[5]	X[5]	X	
03	Freeze protection heater and thermoswitch, 100W	X[5]	X[5]	X	
04	Breather kit				X
05	TCB terminal connection box w/breather kit				X
11	IS1-2 intrinsic safety barrier, 4-20 mA output[6]	X			
12	IS1-3 intrinsic safety barrier, 1-5 V output[7]	X	X	X	X
	MOUNTING HARDWARE SELECTION				
	B100 9G CL3 stainless steel pipe mount clamps	X	X	X	X
	Cable suspension mount fixture	X	X	X	X
	Cable suspension mount stainless steel cable (*specify # of feet*)	X	X	X	X

NOTES:

1. *Breather Kit option required. Also requires regulated 6.25 VDC source. Output not scaled.*
2. *Contact factory for chemical compatibility of materials.*
3. *Must fall within selected Pressure Range. Confirm that cable length is consistent with calibration range.*
4. *Greater than 60 feet, consult factory.*
5. *Requires 120 VAC service.*
6. *Used when upper assembly mounted in hazardous area. Devices shipped loose for mounting in monitoring panel. CMX21 analog signal conditioner module is potted.*
7. *Mounted in upper assembly and used when upper assembly mounted in non-hazardous area.*

DESCRIPTION	PART NUMBER
Sensors	
A1000 1# sensor, up to 2.31'/2.72" (20# proof pressure)	601295-01
A1000 5# sensor, up to 11.55'/138.6" (50# proof pressure)	601295-02
A1000 15# sensor, up to 34.65'/416,0" (75" proof pressure)	601295-03
A1000 30# sensor, up to 69.3'/832.0" (150# proof pressure)	601295-04
A1000 75# sensor, up to 173.25' (375# proof pressure)	601295-05
A1000 150# sensor, up to 346.5'	601295-06
A1000 300# sensor, up to 693'	601295-07
Cables	
A1000 20' cable	601264-02
A1000 30' cable	601264-03
A1000 40' cable	601264-04
A1000 60' cable *(For cable lengths greater than 60 feet consult factory)*	601264-06
Upper Assemblies	
A1000 GSCE (1-5V output), weatherproof fiberglass enclosure	601265-11
A1000 GSCE (4-20 mA output), weatherproof fiberglass enclosure	601294-01
A1000 GSCE (4-20mA), enclosure, 3-1/2 digit LCD digital meter w/viewing window	601294-03
A1000 GSCE (4-20mA), enclosure, heater and thermoswitch	601294-04
A1000 GSCE (4-20mA), enclosure, heater and thermoswitch, 24 VDC loop power	601317-01
A1000 GSCE (120 VAC pwrd, 4-20 mA output), weatherproof fiberglass enclosure)	601265-12
A1000 GSCI (120 VAC pwrd, 4-20 mA), encl, heater & thermoswitch	601265-14
A1000 GSCI (120 VAC pwrd, 4-20 mA), encl, digital meter w/window, htr, thermo	601265-16
A1000 GSCI (120 VAC pwrd, 4-20 mA), encl, digital meter w/viewing window	601265-17
A1000 GSCL (no upper assembly; for use with D15x controllers) breather kit	601288-01
For upper assembly options not shown (intrinsically safe, UL), consult the factory	
Mounting Hardware and Accessories	
B100 9G CL3 stainless steel pipe mount clamps (transducer or float mount)	601134-01
A1000 Cable suspension mount fixture (without SS cable; see next item)	601418-01
A1000 Cable suspension mount stainless steel cable; each additional 10' (XX=length)	601440-XX
A1000 Model TCB terminal connection (junction) box w/breather	601291-02
A1000 Model CMX12 120 VAC powered power supply/4-20 mA transmitter	601119-01
A1000 Model CMX19 signal conditioner/1-5 VDC transmitter	601202-02
A1000 Model CMX21 signal conditioner/4-20 mA transmitter	601285-01
A1000 Model CMX21 signal conditioner/4-20 mA transmitter; intrinsically safe (potted)	601285-02
A1000 Model IS1-2 intrinsic safety barrier; 4-20 mA output (use w/potted CMX21)	601315-04
A1000 Model IS1-3 intrinsic safety barrier; 1-5 V output (standard)	601315-05

COMPLETE CONTROL CAPABILITIES

USFilter Control Systems offers a single, high-quality source for everything from simple level sensors to telemetry systems to complex system control engineering and software. Based in St. Paul, MN, USFilter Control Systems is part of United States Filter Corporation, the leading global provider of industrial, municipal and residential water and wastewater treatment systems, products and services.

As a major manufacturer/integrator with an extensive selection of specialized product lines in the areas of SCADA and telemetry, power equipment integration, automation and measurement, USFilter Control Systems is uniquely positioned to provide cost-effective, comprehensive solutions for water, wastewater, and process control and telemetry applications. Our products and services encompass the following:

- Complete design and engineering services
- Field services, including training and troubleshooting
- Autocon SCADA systems
- Consolidated Electric SCADA systems
- Microcat control and telemetry products
- Remote terminal units and central control units
- Control and monitoring software
- Process control and communications computers
- I/O boards, modems and power supplies
- Power equipment integration
- Programmable logic controller systems
- Programmable process controllers
- Controllers and controller/alternators
- Tank pump control systems
- Pressure/level controllers
- Pump flow and performance monitoring
- Flow switches and float switches
- Intrinsic safety barriers
- Level transducers and level sensors
- Pressure transducers

To find out more about how to put USFilter to work for you, contact us at

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Control Systems
1239 Willow Lake Boulevard
Vadnais Heights, MN 55110
800.224.9474 *phone*
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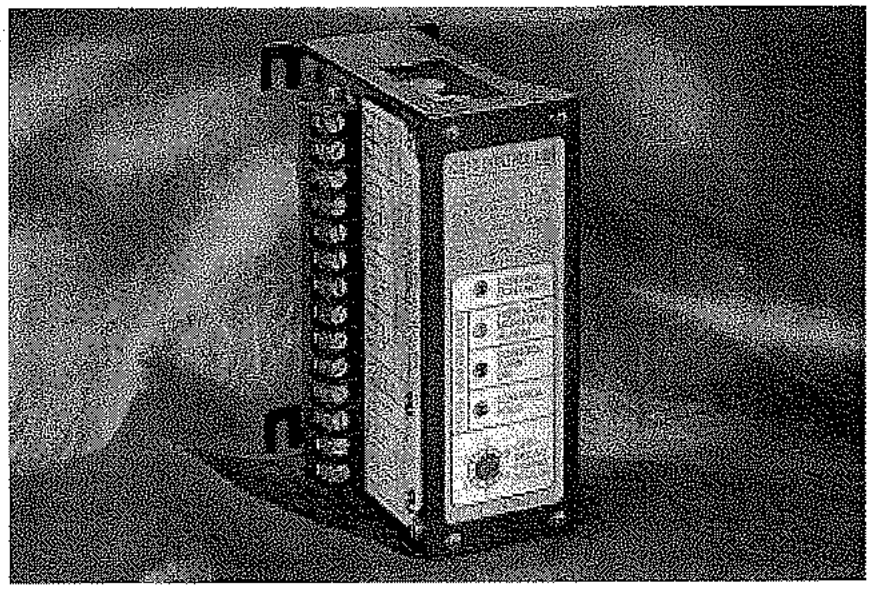
CS-157GSC-BR-0101

CB1T CONTROLLER (B300)



The CB1T is a single-stage controller with high level alarm used in sewage lift stations, high-rise building sumps, storm water pumping stations, water reservoir pump control, wastewater treatment plants, and process and industrial control. It has three output relays – two for pump control (simultaneous operation) and one non-differential high level alarm output.

The CB1T can work as the primary controller with up to three float switches to control one or two pumps. It is often used as a high level alarm device and a redundant, independent controller, using only a single-level sensor. As a back-up system for micro-processor or PLC-based control systems, the CB1T is generally independent of the primary control system as far as alarming is concerned, and its redundant control capability is wired in parallel with the control circuit outputs of the primary system, providing comprehensive back-up control.

CB1T FEATURES

Pump-Down or Pump-Up
Used with normally open or normally closed level sensors (our 9G, LS, etc.).

Compact
6" high x 3" wide x 4.5" deep

Versatile
Functions as a basic single pump control plus high level alarm or fail-safe redundant alarm/controller from a single level sensor.

Operator Convenience
Front panel LED's show level sensor and control output operation; 3/4-turn knob sets off-delay timing period.

Heavy-Duty
Load contacts rated 10 amps @ 250 VAC. Job connections are at clamp terminals accepting one or two AWG #12-20 wires.

Easy To Use
"Looks through" a window in a Power-pack panel or wall-mounted housing.

Choice of Power
120 VAC or 12 VDC

Easy Wiring
Low 8 VDC on sensor circuits allows open wiring.

Enclosure Options
Available with any standard NEMA type.

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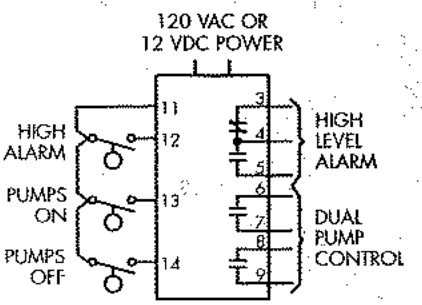
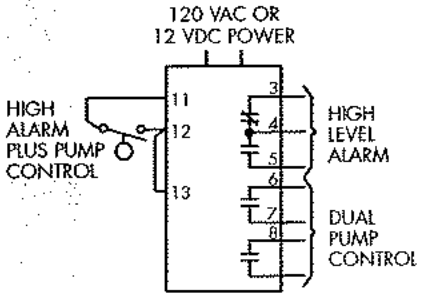
CB1T CONTROLLER (B300)

DESCRIPTION	PART NUMBER
CB1T sump pump/redundant controller, open (no enclosure) (B300)	601280-01
Accessory: IS6 six-circuit intrinsic safety module	601316-02



CB1T Control providing "pump-down" differential control (of two N.O. circuits in unison) plus high level alarm (SPDT) using three N.O. float switches.



CB1T Control providing high level alarm plus redundant duplex (in unison) "pump-down" (timed OFF. . .up to 5 minutes) operation of two pump control circuits.

THE B300 FAMILY

The CB family of products provides a cost-effective, reliable means of using float switches or control logic inputs to control pumps, valves and alarms. Each unit is UL-approved and can be used as a component of an Industrial Control Panel requiring UL508 or 913 compliance. These controllers are offered either as basic control systems or built into Powerpack™ panels specifically designed to meet exacting job requirements.

The CB family of controllers is supplied with on-board transient protection and 12 VDC power supply. The controllers provide a low-voltage DC output (<8 VDC) to the discrete level sensors. If intrinsic safety is required, the CB controller can be used in conjunction with an IS6 Intrinsic Safety Barrier. The on-board 12 VDC supply is capable of powering the IS6.

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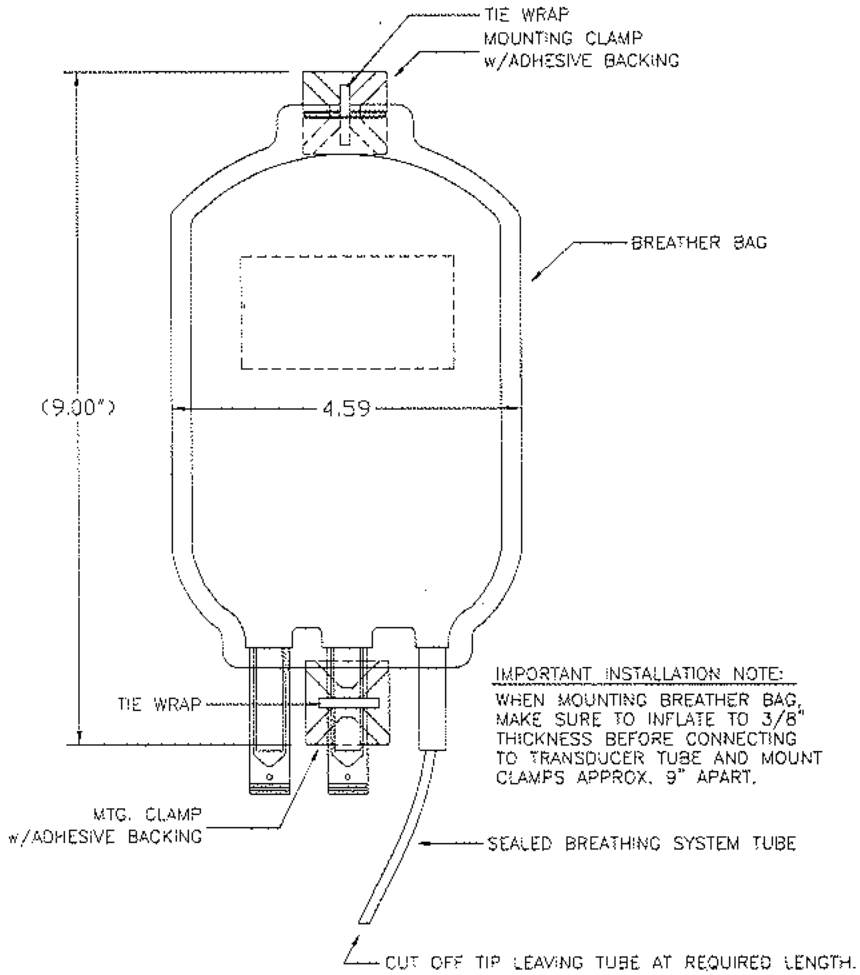


IMPORTANT INSTALLATION NOTE:

WHEN MOUNTING BREATHER BAG, MAKE SURE TO INFLATE TO 3/8" THICKNESS BEFORE CONNECTING TO TRANSDUCER TUBE AND MOUNT CLAMPS APPROX. 9" APART.

USFCS PDF No. 2398 Rev.: 3-02

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	02/02	JVE	WRB	MRB	

DESIGNER JVE DATE 02/02
DRAWN DATE
CHECKED WRB 02/02
ENGINEER DATE
MANAGER DATE
FILE: 60128B000!-DR-AC-BG-BAG
SCALE: NONE

TITLE: BREATHER BAG ASSEMBLY

CLIENT:

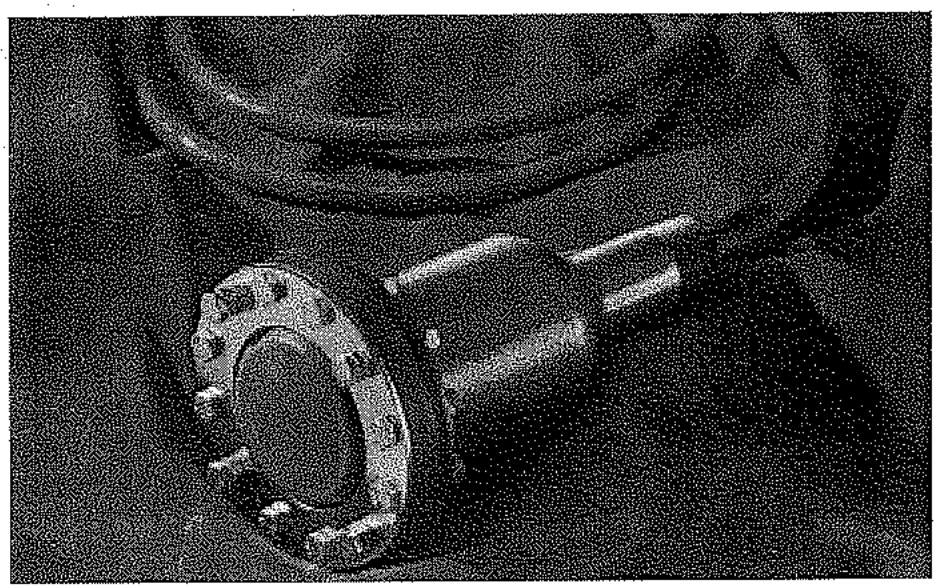
USFilter — US FILTER CONTROL SYSTEMS, VADNAIS HEIGHTS, MN, PH. 651-766-8700

PROJECT	CODE	DRAWING	SHEET	REV
60128B000!	000	M	1 OF 1	0

STD. 3-0200-2493501 — INTL. REF: — BAR = 1" AT PLOT SCALE

DATA SHEET

A1000i Loop Powered/4-20mA Submersible Level Transmitter



Features In Brief:

- *Economically Priced*
- *Easy trouble free installation*
- *Rugged, debris-free non-fouling Teflon™ coated 316 stainless steel housing.*
- *Large protruding (no cavity to clean) 2 5/8" Teflon Coated–Buna-N sensing diaphragm.*
- *Maintenance free "Rigid Sealed Breather system" reliably equalizes atmospheric pressure.*
- *Versatile mounting arrangements*
- *Intrinsically safe, Class I, Div. 1 A, B, C & D rated with approved barrier.*
- *Pre-calibrated Pressure ranges from 1.5 PSI to 30 PSI. (0-3.5 ft to 0-69.3 ft)*
- *Transducer electronic components are electronically and physically isolated from sensed media.*

The A1000i Submersible Level Transducer is the industry's most highly engineered and advanced submersible level transmitter for the measurement of liquids containing high amounts of solids such as raw sewage/wastewater. The unit works equally well in potable water applications. The robustness and high reliability of the A1000i is based on its maintenance free design and simplicity of operation allowing it to operate in harsh environments. The unit is unaffected by turbulence, foaming, false echoing, solids build up, and atmospheric changes that often cause other level transmitter technologies to fail. A selection of pressure ranges is available to fit most wet well level/pressure measurement applications from high accuracy weir level/flow rate measurement to the deepest of wet wells and storage tanks. Several mounting options are available including vessel, pipe, fixed and suspension kits.

Applications:

- Wastewater
  - Sewage lift station wet wells
  - Headworks
  - Combined Sewer Overflow (CSO)
  - Sequencing Batch Reactors (SBR)
  - Lagoons/ponds, Lakes & Rivers
  - Equalization Basins
  - Weir Flow Measurement
  - Contact Tanks
  - Sumps
- Water
  - Raw Water Intake Level
  - Filter Water Levels
  - Clearwells
  - Backflush Decant Tanks
  - Above or Below Ground Storage Tanks
  - Standpipes

Theory of Operation:

The A1000i utilizes pressure, the most reliable means to measure liquid level. The sensor assembly is mounted at a low point (fixed or suspended) within the liquid media and uses a sensing diaphragm to measure the hydrostatic head-pressure. The pressure produced is proportional to the height of the liquid above the sensing diaphragm.

The protruding (no cavity) flexible Teflon coated Buna-N diaphragm uses a liquid fill to transfer the external diaphragm pressure to a stable and accurate gauge pressure type piezoresistive sensor. The transducer uses the loop power excitation source (9-30VDC) and converts the pressure to a proportional (4-20mA) electrical signal. The transducer is barometrically compensated via a rigid breather tube connected to a panel mounted sealed breather system.

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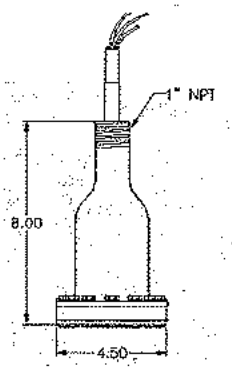
DATA SHEET

Part Numbers



Lower Assembly Dimensions

Specifications	
Housing	316 cast stainless steel , Teflon™ coated
Cable	Heavy-duty polyethylene with vent tube, 18 AWG conductors and shield.
Atmosphere Ventilation	No maintenance sealed breather system equalizes atmospheric pressure
Mounting	Suspension Cable mount or 1" pipe mount
Exposed Materials	#316 SS, PVC, Teflon™, synthetic rubber and urethane.
Sensing head	Two layer diaphragm with Teflon™ and Buna-N material.
Power Required	9 - 30 VDC (750 ohm Load @ 24VDC)
Signal Output	4 - 20mA Two wire shielded conductor cable
Agency Approval	FM and CSA Intrinsically Safe Class I, Div. I, Groups A,B,C,D with approved barrier.
Accuracy	0.25 % Full Scale with long term stability of 0.2 % Full Scale per year.
Pressure Ranges	1.5 PSI to 30 PSI (Consult factory for ranges over 30 PSI)
Max Over Pressure Range	1.5 PSI 8X Full Scale 5.0 PSI 4X Full Scale 15 PSI & 30 PSI 2X Full Scale
Temperature Range	-40 to +185°F (Liquid must remain fluid)

Description	Part Number
A1000i Sensors	
1.5 PSI 4-20mA output (0-3.5 ft of water)	6012950011
5 PSI 4-20mA output (0-11.5 ft of water)	6012950012
15 PSI 4-20mA output (0-34.7 ft of water)	6012950013
30 PSI 4-20mA output (0-69.3 ft of water) Consult factory for ranges over 30 PSI.	6012950014
Housing/Cable Assembly	
A1000 Housing/Cable Sub-Assembly 20ft	6012640002
A1000 Housing/Cable Sub-Assembly 30ft	6012640003
A1000 Housing/Cable Sub-Assembly 40ft	6012640004
A1000 Housing/Cable Sub-Assembly 60ft	6012640006
A1000 Housing/Cable Sub-Assembly 80ft	6012640008
A1000 Housing/Cable Sub-Assembly 100ft	6012640010
A1000 Housing/Cable Sub-Assembly custom lengths (XX equals number of feet)	60126400XX
Mounting Hardware and Accessories	
B100 9G CLS Stainless Steel Pipe Mounting Clamps	6011340001
Cable Suspension Mounting Pipe (without SS cable)	6014180001
Stainless steel cable; each additional 10' ft (XX)	60144000XX
Breather Assembly Kit (required for all A1000i sensors)	6012880001
Terminal Connection (Junction) Box w/Built In Breather Assembly	6012910002

Complete Control Capabilities

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Product Specification

A1000i Loop Powered/4-20mA Submersible Level Transmitter/Transducer

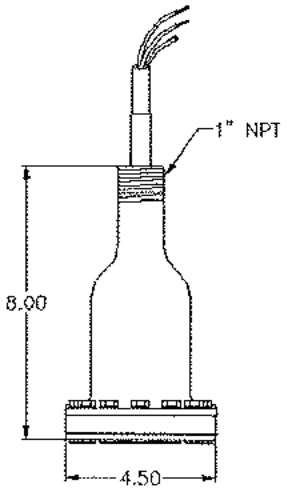
The A1000i is a 9-30VDC, two wire loop powered submersible level transducer with a 4-20mA signal output. It is mounted at a low point in a liquid media. The transducer uses a gauge pressure piezoresistive sensor element to measure the hydrostatic head-pressure. The sensor element is isolated from the media by a Teflon coated Buna-N diaphragm. This pressure is proportional to the height of the liquid above the sensing diaphragm and is converted to a proportional 4-20mA signal. This 4-20mA signal spans the full pressure range of the transducer.

The transducer is barometrically compensated via a rigid breather tube connected to a panel mounted sealed breather assembly. All A1000i transducers require a Breather Assembly Kit.

Part Number	Description
	Sensors
6012950011	A1000i sensor 1.5 PSI 4-20mA output (0-3.5 ft of water)
6012950012	A1000i sensor 5 PSI 4-20mA output (0-11.5 ft of water)
6012950013	A1000i sensor 15 PSI 4-20mA output (0-34.7 ft of water)
6012950014	A1000i sensor 30 PSI 4-20mA output (0-69.3 ft of water)
	Housing/Cable Assembly
6012640002	A1000 Housing/Cable Sub-Assembly 20ft
6012640003	A1000 Housing/Cable Sub-Assembly 30ft
6012640004	A1000 Housing/Cable Sub-Assembly 40ft
6012640006	A1000 Housing/Cable Sub-Assembly 60ft
6012640008	A1000 Housing/Cable Sub-Assembly 80ft
6012640010	A1000 Housing/Cable Sub-Assembly 100ft
60126400XX	A1000 Housing/Cable Sub-Assembly custom lengths (XX equals number of feet)
	Mounting Hardware and Accessories
6011340001	B100 9G CLS Stainless Steel Pipe Mounting Clamps
6014180001	Cable Suspension Mounting Pipe (without SS cable)
60144000XX	Stainless steel cable; each additional 10' ft (XX)
6012880001	Breather Assembly Kit (required for all A1000i sensors)
6012910002	Terminal Connection (Junction) Box w/Built In Breather Assembly

Agency Approval FM and CSA Intrinsically Safe Class I, Div. 1, Groups A,B,C,D with an approved barrier.

Specifications



Environmental

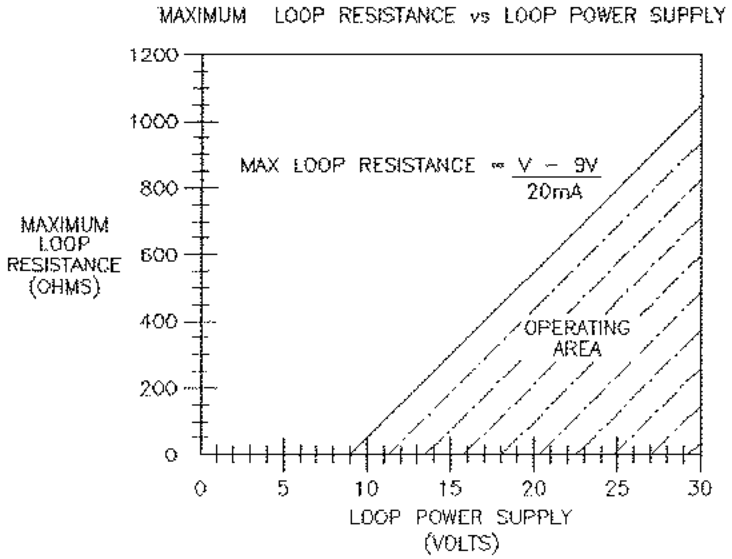
Atmosphere Ventilation	sealed breather system equalizes atmospheric pressure
Operating Temperature	range 32°F to +158°F Liquid must remain fluid.

Physical

Housing	316 cast stainless steel, Teflon™ coated
Cable	heavy-duty polyethylene with vent tube, shield and 18 AWG conductors
Mounting	suspension cable mount or 1" pipe mount
Pressure Ranges	1.5 PSI to 30 PSI
Max Over Pressure Range	1.5 PSI 8X full scale 5.0 PSI 4X full scale 15 PSI & 30 PSI 2X full scale
Exposed Materials	316 cast stainless steel Teflon™ coated, synthetic rubber and urethane
Sensing Head	two-layer diaphragm with Teflon™ and Buna-N material

Electrical

Power Required	9 – 30 VDC	
	Typical Loop Resistance	250 ohm @ 15VDC
	Maximum Loop Resistance	750 ohm @ 24VDC
Signal Output	4 - 20mA	
Accuracy	±0.25 % full scale with long term stability of 0.2 % full scale per year.	



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Intrinsically Safe Barrier Applications

When selecting an intrinsically safe barrier consider the following: cable length, classification of hazardous area, cable inductance and capacitance, and the intrinsic safe ground system.

Barriers whose entity parameters meet the following requirements can be used.

Voc ≤ Vmax
Isc ≤ Imax
Ca > Ci + Ccable
La > Li + Lcable

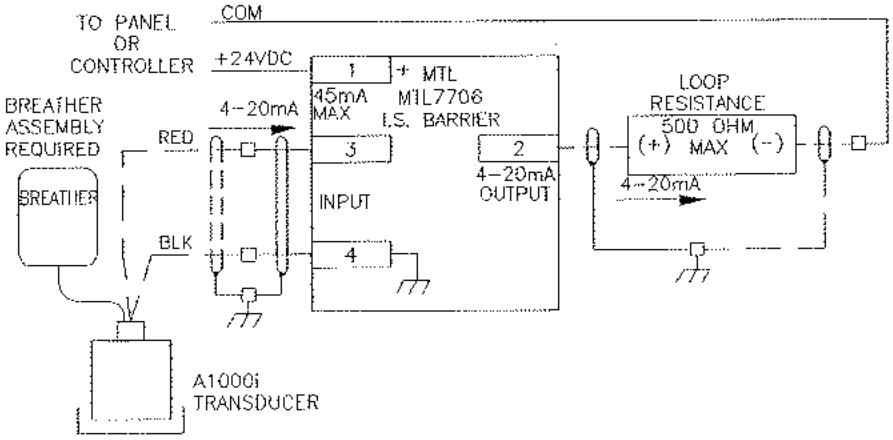
A1000i Transmitter Entity Parameters			
Vmax	**Imax**	**Ci**	**Li**
28V	93mA	0.11 uF	0.22mH

Note: USFCS IS1-2 Part number 6013150004 does not meet these entity parameters.
An intrinsically safe system should be designed and tested by a qualified engineering professional.

Compatible Barriers			
Manufacturer	**Part No.**	**Type**	**MAX Loop Resistance**
MTL	7706	Amplified Zener, Common Neg.	500 ohms
MTL	5041	Galvanically Isolated	1000 ohms
Phoenix Contact	Model PI/Ex-ME-RPS(s)-I/I 2835422	Galvanically Isolated	800 ohms

Note: Each of the barriers requires 24VDC to operate. When any of these barriers are used, with a CMR25-04, an external power source is required to power the IS barrier.

MTL7706+ Active Zener Barrier (UL Pending)



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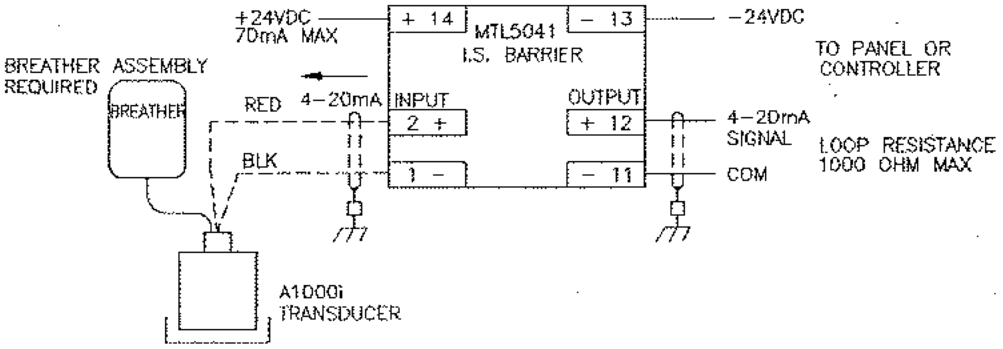
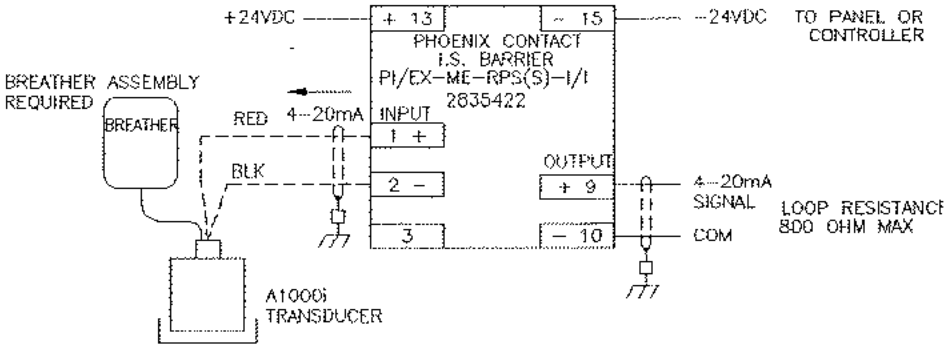
MTL5041 Galvanically Isolated Barrier



Phoenix Contact Model PI/Ex-ME-RPS(s)-I/I Galvanically Isolated Barrier



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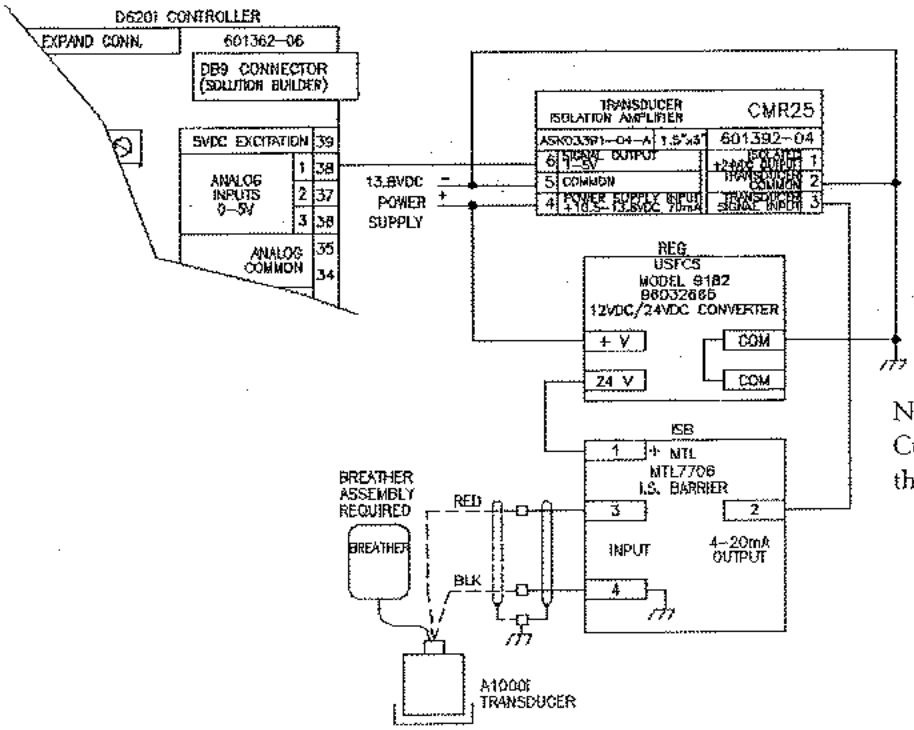
D620i CMR25 and IS Barrier Application

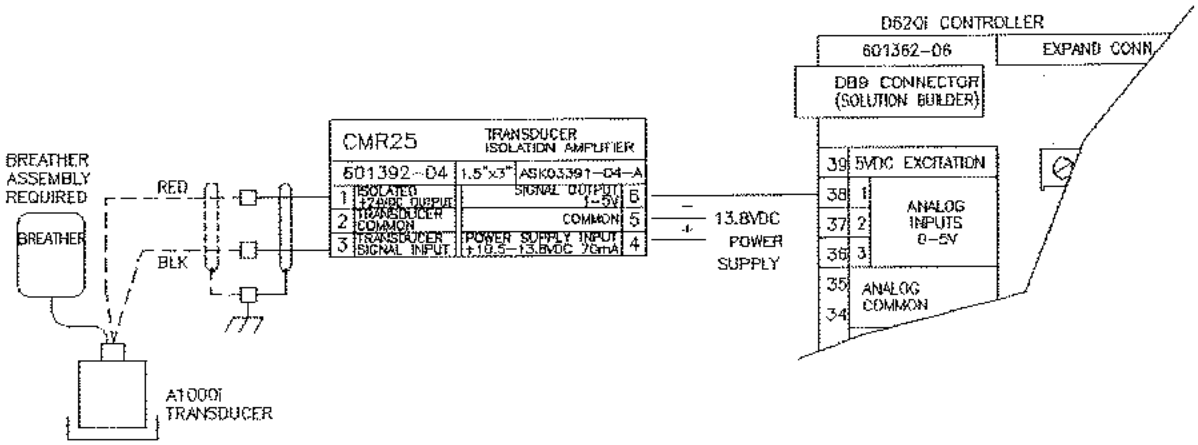
Note: This application connects the D620I common to ground.



Note:
Current flows through ground.

D620i Application

Note: This application is not intrinsically safe.



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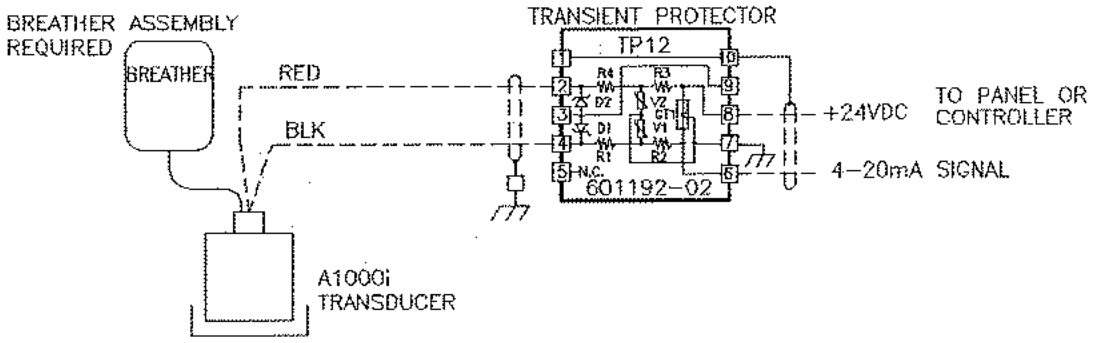
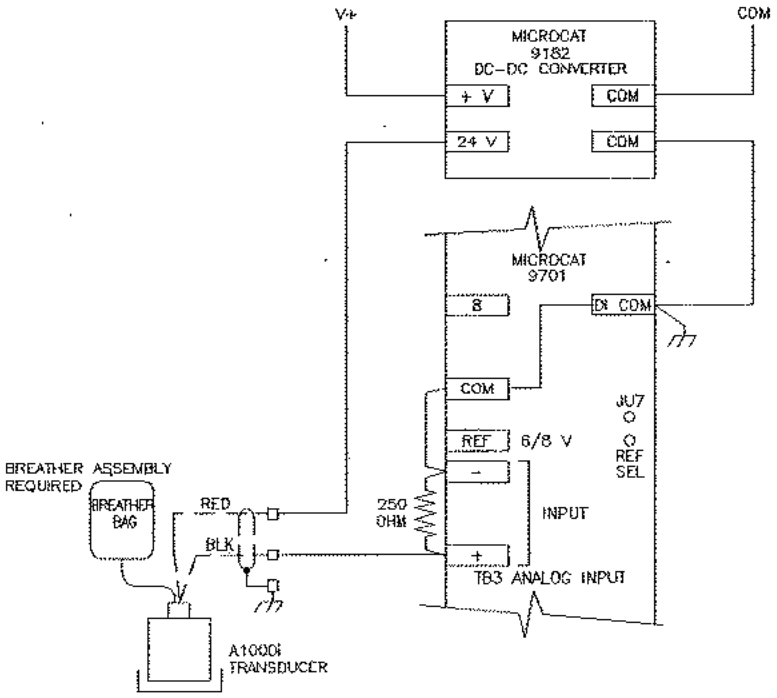
TP12 Transient Protector Application

Note: This application is not intrinsically safe



Microcat Application

Note: This application is not intrinsically safe.



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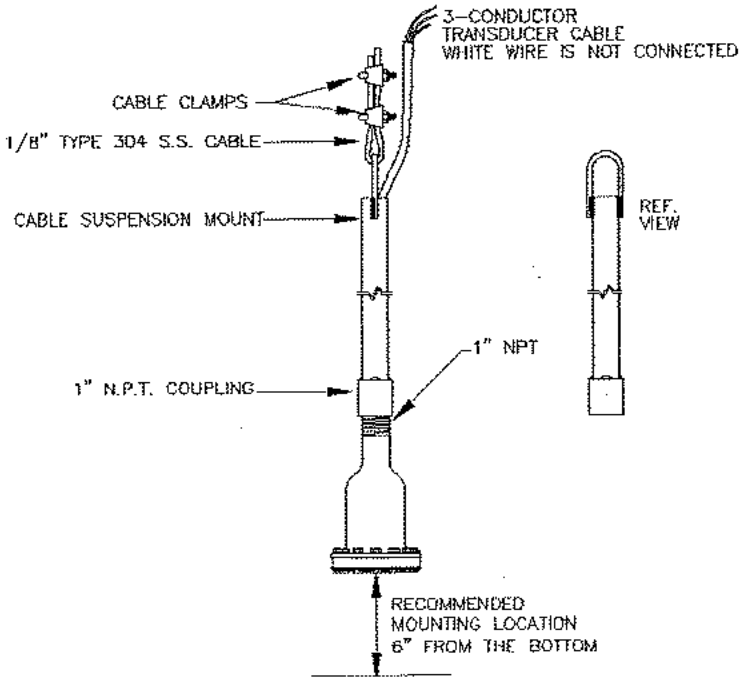
Suspension Cable Mounting



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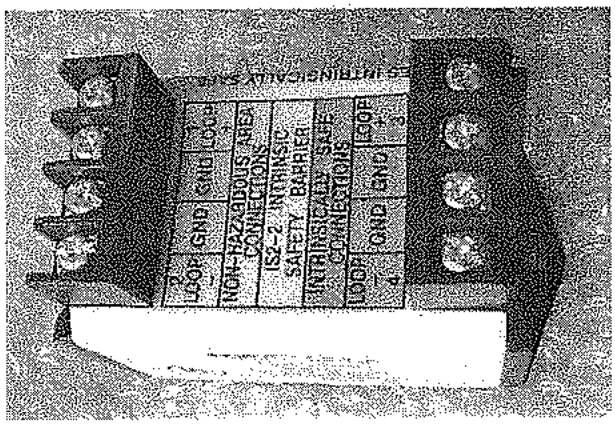
Product Specification

IS2-2

Two Channel 4-20 MA Intrinsically Safe Barrier, A1000i Compatible

The IS2-2 is a Zener type barrier rated for Class I Div 1, Groups C, D, Class II, and Class III. It is used with the A1000i submersible level transmitter in hazardous locations such as sewage lift station wet wells. This barrier is UL listed under file E123925. Refer to installation drawing AIM 7360 for entity parameter details.

Part Number	Description
6013150006	IS2-2, Two channel 4-20 MA Intrinsically Safe Barrier, A1000i Compatible.



Specifications

Physical

Dimensions	2"W x 3"H x 2"D
Mounting	Panel Mount, 2 screws

Electrical

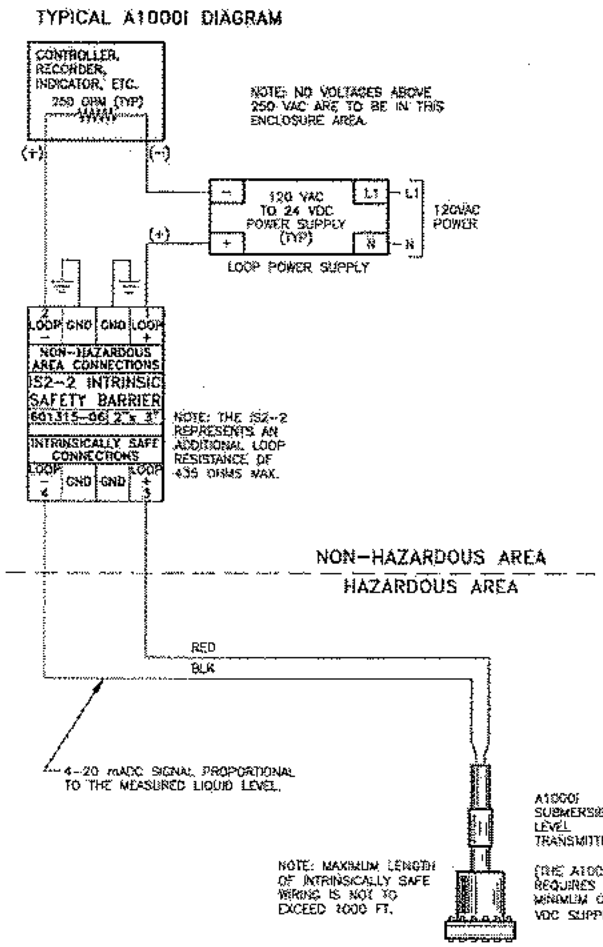
Power Supply Requirements	Max Loop Supply – 24 VDC
Signal Input/Output	4 – 20 mA
Max Loop Resistance of Barrier	435 ohms

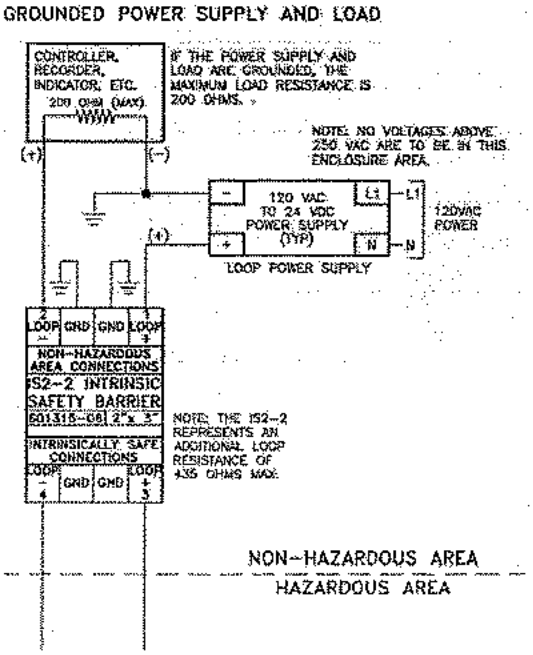
Terminal Description

Terminal Type	Clamp Type, 14-22 AWG wire
Terminal 1:	(+) Loop Supply, (24.0 VDC)
Terminal 2:	(-) 4-20mA Output
Terminal GNDs:	Earth Ground to approved IS ground
Terminal 3:	(+) Loop Supply to hazardous area
Terminal 4:	(-) 4-20 MA Return from hazardous area

Calibration Adjustments: None

Wiring Diagrams





IS2-2 Product Specification.doc
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IS6 INTRINSIC SAFETY BARRIER

NEC DEFINITION OF HAZARDOUS LOCATIONS

The NEC Handbook defines hazardous locations by Class, Division and Group as follows:

Class I Locations – Are those in which flammable gasses or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class II Locations – Are those which are hazardous because of the presence of combustible dust.

Class III Locations – Are those which are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in air in quantities sufficient to produce ignitable mixtures.

Division 1 – Locations in which hazardous concentrations in the air exist continuously, intermittently, or periodically under normal operating conditions.

Division 2 – Locations in which hazardous concentrations are handled, processed, or used but are normally confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown.

Group A – Atmospheres containing acetylene.

Group B – Atmospheres containing hydrogen, or gasses or vapors of equivalent hazard, such as manufactured gas.

Group C – Atmospheres containing ethyl-ether vapors, ethylene, or cyclopropane.

Group D – Atmospheres containing gasoline, hexane, naphtha, benzine, butane, propane, alcohol, acetone, benzol, lacquer solvent vapors, or natural gas.

Group E – Atmospheres containing metal dust, including aluminum, magnesium, and their commercial alloys, and other metals of similarly hazardous characteristics.

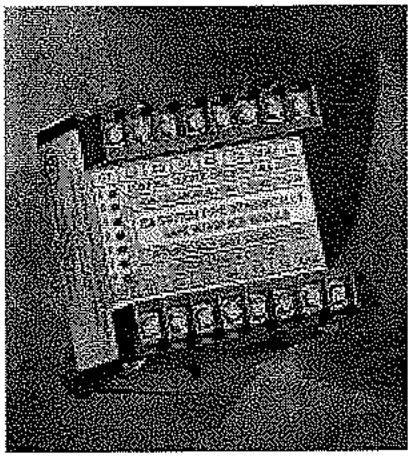
Group F – Atmospheres containing carbon black, coal, or coke dust.

Group G – Atmospheres containing flour, starch, or grain dusts.

The IS6 Intrinsic Safety Barrier is a six-circuit, shunt-diode barrier ON/OFF switch circuit interface that is used between Monitoring and Pump/Alarm Controller Equipment and its level sensor float switch circuitry to render such circuitry "intrinsically safe" and thus suited for installation in a hazardous location such as a sewage or freeway stormwater-handling pump station collection sump.

Powered by the associated Monitor/Controller, the IS6 Barrier has open-collector drivers that provide input sensor signals to the controller in response to the operation of level-sensing float switches in the hazardous location. The IS6 Barrier is most commonly used with our LS and 9G Float Switches, but it can be used with any general purpose simple switch device with N.O. or N.C. non-powered contacts within its application parameters.

The IS6 module is designed to make its associated switches and circuitry suited for Class I, Division 1 or 2, Groups A, B, C and D, and Class II, Division 1 or 2, Groups E, F, and G hazardous locations as defined by the NEC (National Electrical Code).



The IS6 is ideally suited for applications requiring compliance with UL 913 procedures pertaining to electrical control panels with intrinsically safe extensions to hazardous areas. It includes LED indicators for power and circuit activation.

IS6 PRODUCT SPECIFICATIONS

Cable Lengths: Cable lengths from the module to the switches are to be limited to 300 feet each, or a maximum of 18,000 pF and 60 uH per circuit.

Hazardous Area Connections: Entity parameters (per channel):

- Maximum voltage: 12.6 volts
- Maximum output current: 1.3 mA
- Maximum allowable capacitance: 0.018 uF
- Maximum allowable inductance: 0.06 mH

IS6 Power: The IS6 Module is typically powered by +10.5 to 25 VDC and requires a maximum of 50 mA from an associated monitor/controller, such as our CB1T, CMC15, CB2D, CB23, CB234 or DC power supply. The outputs of the IS6 are open-collectors capable of sinking up to 150 mA and withstanding up to 50 VDC.

Operating Temperature Ranges: -29° to +149° F (-20° to +65° C)

Outside Dimensions: 4" high x 3" wide x 2-1/4" deep

IS6 TYPICAL SPECIFICATIONS

The float switch level sensors shall interface to the control circuitry via an intrinsic safety barrier. The barrier shall provide an intrinsically safe interface for up to six sensors located in a hazardous area rated Class 1, Division 1 or 2, Group A, B, C, and D, and Class II, Division 1 or 2, Groups E, F, and G. The barrier shall contain an LED indicator for each of up to six sensor inputs, providing visible indication of sensor actuation as well as an LED to indicate barrier "Power On" status. The intrinsic safety barrier shall be UL-listed for use in hazardous locations.

DESCRIPTION	PART NO.
Model IS6 six circuit intrinsically safe (switch circuit) barrier, 12/24 VDC powered	601316-02

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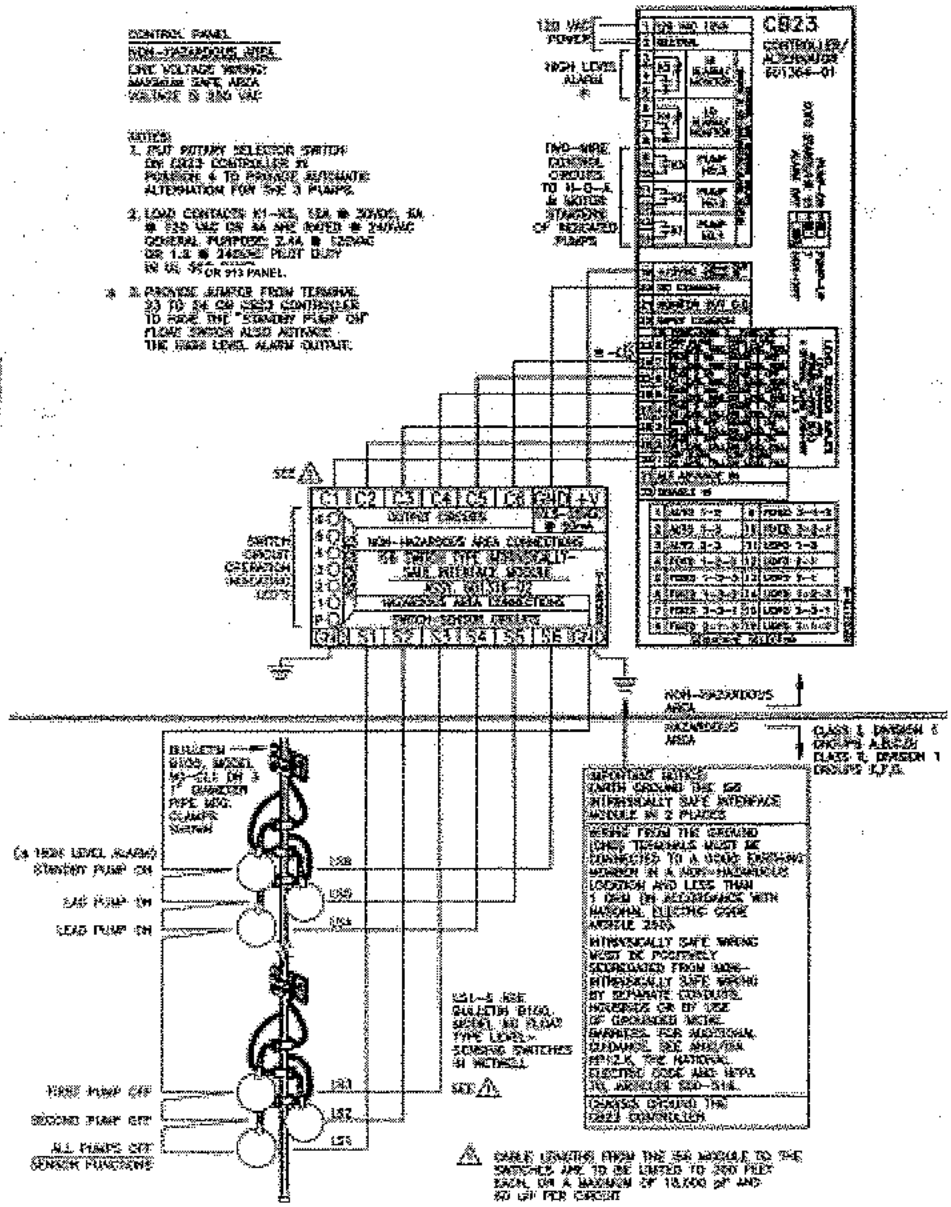
IS6 INTRINSIC SAFETY BARRIER

Interconnection Diagram of IS6 Intrinsic Safety Barrier with CB23 Pump Controller/ Alternator showing Intrinsically Safe Level Sensor Float Switch Circuitry



COMPLETE CONTROL CAPABILITIES

USFilter Control Systems offers a single, high-quality source for everything from simple level sensors to telemetry systems to complex system control engineering and software. Based in St. Paul, Minnesota, USFilter Control Systems is part of United States Filter Corporation, the leading global provider of industrial, municipal and residential water and wastewater treatment systems, products and services. As a major manufacturer/integrator with an extensive selection of specialized product lines in the areas of SCADA and telemetry, power equipment integration, automation and measurement, USFilter Control Systems is uniquely positioned to provide cost-effective, comprehensive solutions for water, wastewater, and process control and telemetry applications.

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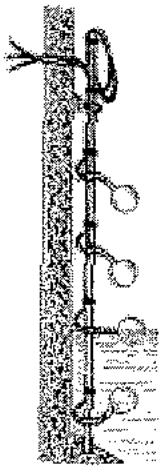
9G-EF (MERCURY FREE) DIRECT ACTING FLOAT SWITCH (B100)



9G EF Floats provide reliable performance in "unbelievable surroundings."

Features

- *Mercury Free – Magnetic Reed Switch*
- *Long life and reliable operation*
- *Non-oxidizing contacts allow low DC voltage signals for use with intrinsic safety devices*
- *Non-stick surface*
- *High buoyancy*
- *Pipe or suspension mounting*
- *3 year factory warranty*

Arguably the best non-mercury float switch available, this Teflon®-coated non-differential float of Type 316 stainless steel measures 5.5" in diameter. It is appropriate for a variety of applications, including sewage wet wells, storm water basins, water reservoirs, sludge tanks, irrigation canals and process sumps. The float operates reliably in even the most difficult environments. The 9G-EF can be used singly to sense an alarm level, but typically two or more switches are used in conjunction with our controllers to provide a float-based control system. The 9G-EF can be used as the redundant control sensor in larger automation installations.

TYPICAL SPECIFICATIONS

Float switch body shall be constructed of Teflon®-coated, 20 gauge, 316 stainless steel housing measuring not less than 5 1/2" in diameter. A long life, high reliability, potted SPST magnetic reed switch rated for not less than 100 VA at up to 250 Volts shall be mounted inside the float and connected to a multi-stranded, 2 conductor plus ground, 16 gauge, CPE jacketed cable. The cord shall have fine strand conductors (not more than 34 gauge) made especially for heavy flexing service. The cable connection point shall be potted in epoxy providing a strong bond to the float and reed switch forming a water/moisture tight connection. A flexible Neoprene sleeve, not less than 1/8" thick, shall be provided over the CPE jacketed cable extending not less than 5" from the top of the mounting bracket extending down through the cable mounting bracket hinge point to the top of the float switch body, providing cable stress point relief and extended operational life.

A 316 stainless steel flanged cable mounting clamp assembly shall be supplied allowing pipe or cable mounting as specified below. The float cable-mounting bracket shall be flared on both sides providing hinge point stress relief to both sides of the cable.

The float switch assembly shall provide a minimum of two pounds of buoyancy in solutions with a specific gravity of 1.0 (water) and shall have an operating temperature rating of -35 to +90 degrees C.

The float switches shall be Model 9G-EF floats as manufactured by USFilter Control Systems.

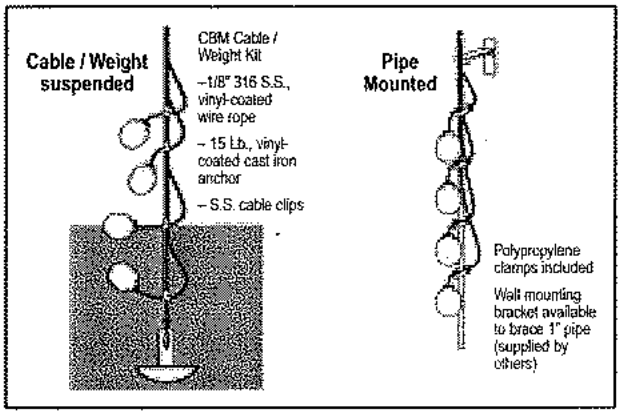
USFilter

9G-EF (MERCURY FREE) DIRECT ACTING FLOAT SWITCH (B100)

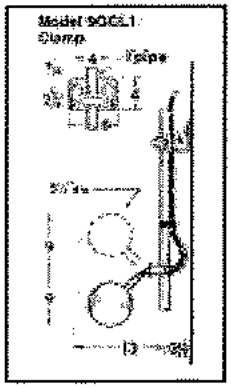
DESCRIPTION	PART NUMBER
9G-EF NOTP Float Switch	
w/30' cable & clamp for pipe or cable mounting*	6013520030
w/60' cable & clamp for pipe or cable mounting*	6013520060
9G-EF NCTP Float Switch	
w/30' cable & clamp for pipe or cable mounting*	6013530030
w/60' cable & clamp for pipe or cable mounting*	6013530060
** specify pipe or cable mounting at time of order*	
Mounting Hardware & Accessories	
9G CL3 stainless steel pipe mount clamps (transducer or float mount)	6011340001
CBM 15# anchor mounting kit (does not include SS cable; see next item)	803360ANC
CBM stainless steel cable; 20'	6014400020
CBM stainless steel cable; each additional 10' (XX=length)	60144000-XX
9G CC cable mount clamp kit (included w/float; only req'd as replacement)	6012120001
9G pipe mount clamp kit (included w/flat; only req'd as replacement)	6011840001
TCB fiberglass junction box with terminal blocks for 4 switches and ground lug	6011020001
IS6 intrinsic safety barrier – requires 12-24 VDC @ 50 mA power source	6013160002

TYPICAL MOUNTING

(See Mounting Hardware and Accessories)



PIPE MOUNTING DIMENSIONS



COMPLETE CONTROL CAPABILITIES

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Product Specification and Installation Instructions

B100 Floats
9G and 9G-EF Float Switch

9G Float

The 9G float is a mercury tilt type direct acting, non-differential float switch. A mercury SPST switch is housed in a 5 ½" Teflon coated, Type 316 Stainless Steel ball which has continuously welded seams and is pressure tested to ensure leak-proof operation. The float is supported by a CPE jacketed, heavy-duty cable. 9G floats are available in normally open and normally closed configurations.

PN	Description
6013400030	9G NO Teflon coated, 316 SS float, 30' cable
6013400060	9G NO Teflon coated, 316 SS float, 60' cable
6013500030	9G NC Teflon coated, 316 SS float, 30' cable
6013500060	9G NC Teflon coated, 316 SS float, 60' cable

9G-EF Float – Mercury Free

The 9G-EF is a mercury free, direct acting, non-differential float switch. A SPST magnetic reed switch is housed in a 5 ½" Teflon coated, Type 316 Stainless Steel ball which has continuously welded seams and is pressure tested to ensure leak-proof operation. The float is supported by a CPE jacketed, heavy-duty cable. 9G floats are available in normally open and normally closed configurations.

PN	Description
6013520030	9G-EF NO Teflon coated, 316 SS float, 30' cable
6013520060	9G-EF NO Teflon coated, 316 SS float, 60' cable
6013530030	9G-EF NC Teflon coated, 316 SS float, 30' cable
6013530060	9G-EF NC Teflon coated, 316 SS float, 60' cable

Specifications	9G Mercury float	9G-EF – Mercury Free
Type of switch	Resistive Mercury switch	Magnetic reed switch
Electrical Rating of contact	15 A @ 115 Vac 10 A @ 230Vac	Min 100VA up to 250V
Conductors/AWG Color code	3 –14 AWG Black White - Green -Ground	3 – 16 AWG Black White - Green -Ground
Float Body	316 SS 5 ½" dia. ball Teflon coated	316 SS 5 ½" dia. ball Teflon coated
Float Cable mounting Clamp (normally included with float if requested)	6012120001	6012120001
Float Pipe mounting clamp (normally included with float if requested)	6011840001	6011840001
Operating temp	-35 to 90 deg C	-35 to 90 deg C
Max Float per anchor	8	8
Physical cable material	CPE	CPE

Float Operation/Application

Each 9G Float Switch operates ON and OFF at about the same level. The difference between the ON and OFF set point (differential) is less than one inch. Typically a float is used to activate a level alarm or to control a pump. In pump or valve control applications, two floats are used to provide differential control. Differential control avoids erratic ON/OFF operation caused by turbulence or wave action. Multiple floats can be used to control more than one pump. The exact number of floats depends on the number of pumps and the desired sequence of operation. Figure 1 is an example of a typical duplex lift station. The bottom float is the common OFF float, the next two floats turn on each pump, and the top float is a high-level alarm float.

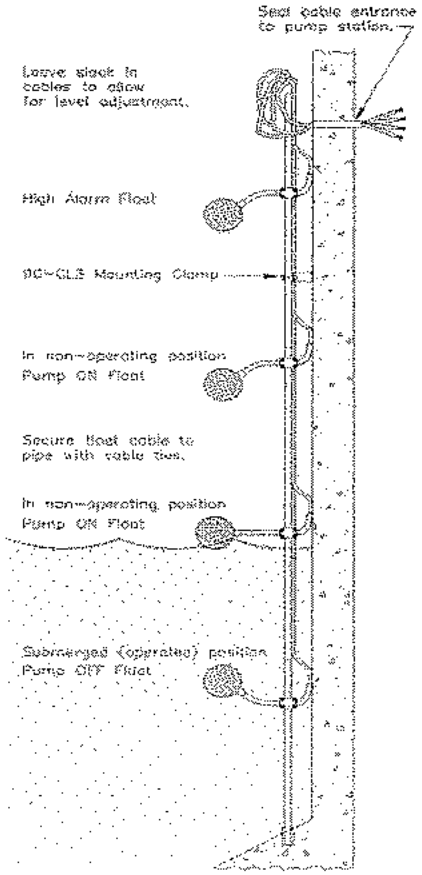

Figure 1 – Typical Clamp & Socket Application

General Float Mounting Guidelines

Mount the float(s) away from walls and other objects and space them as far apart as possible from each other. This will help prevent the floats from interfering with each other.

Avoid installing floats near pump suction or other similar location where the flow of liquid past the floats might cause towels, rags, etc., to be drawn around the float and prevent free operation.

As you consider alternative mounting methods, carefully consider the ease of removal. As with any system, the setpoints may need adjustment and periodic maintenance will need to be performed. Ease of removal, the time to remove, and the operator's safety are prime considerations when considering alternative mounting methods. See Figure 2 for Two Clamp Pipe Mounting Method.

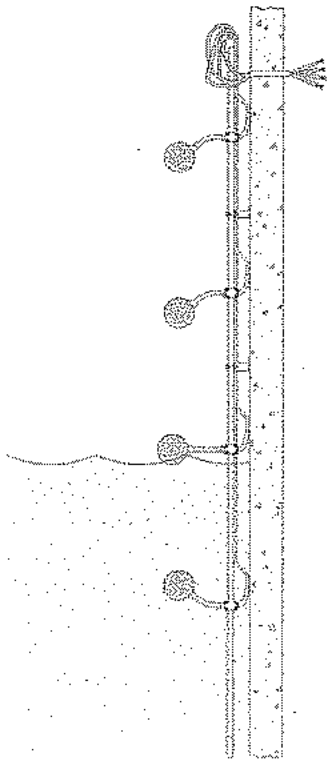

Figure 2 – Two Clamp Pipe Mounting Method

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Pipe Mounting Options

There are numerous ways to vertically mount a pipe. The two most common methods are described below.

Clamp and Socket
One typical installation is shown in Figure 1. A 9G-CL3 Pipe Mounting Clamp (see Figure 3) securely holds the top of the pipe. The customer supplied mounting socket at the bottom positions the pipe into the proper vertical orientation.

Two Clamps. Another mounting means is shown in Figure 2, the two 9G-CL3 pipe mounting clamps near the upper end of the pipe (and mounted an appropriate distance apart) provide the necessary support to suspend the 1" pipe.

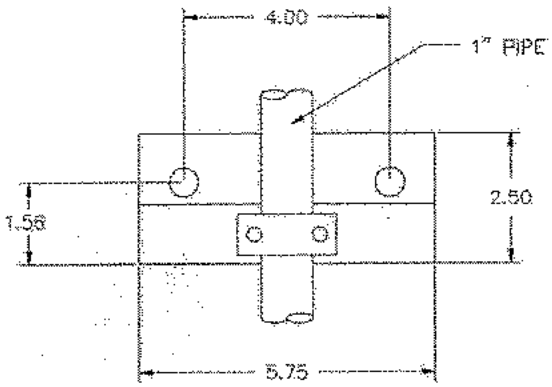

Figure 3 - 1" Pipe-To-Wall Mounting Clamp

How to Pipe Mount a Float

1. Mark the float's point on the pipe. Often, the floats are mounted to the pipe as the pipe rests on the ground. The pipe is then dropped into the tank and the floats are wired to the control panel. In order to position the float correctly, mark the pipe at the desired float-mounting levels before clamping the floats to the pipe. Refer to Figure 4 for pipe mounted dimensions.
2. Assemble the float's pipe mounting clamp. Each float has a cord gripping tube crimped to the cable. The float's pipe mounting kit is assembled around the cord grip tube by following the instructions provided with the mounting kit. The mounting kit is then finger tightened to secure the float to the pipe. See figure 5.
3. Tighten each float assembly. The floats do not require a specific orientation to operate properly. Make sure each float is at the proper position (see #1 above) and tighten the nuts securely.
4. Secure the jacketed cable. Attach the float cables to the vertical pipe by using the cable ties included with each float.

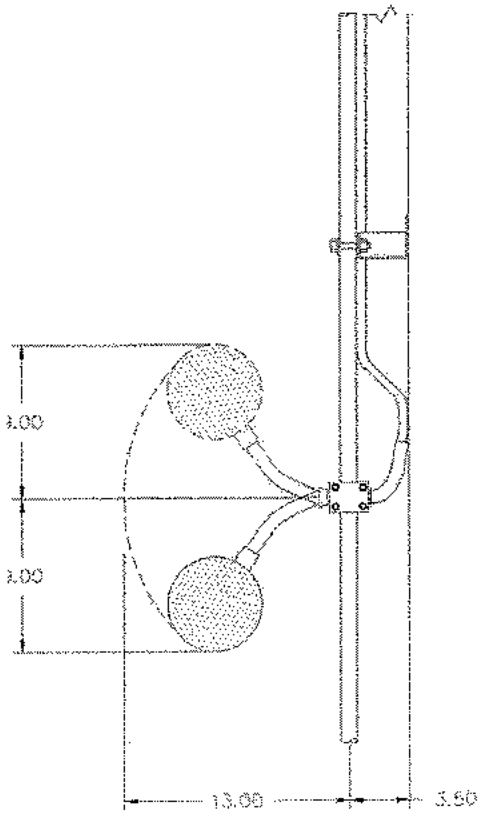

Figure 4 - Pipe Mounted Dimensions

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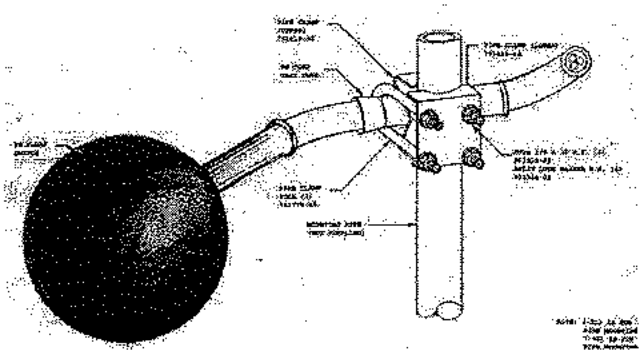

Figure 5 Float-To-1" Pipe Stainless Steel Clamp
P/N 6011840001

Cable Mounting

A stainless steel cable and suitable anchor provides drift free mounting and convenient removal for float switch adjustment. The cable/weight suspension system also requires less space and no tangling problems when compared to individually suspended float/weight mounting arrangements. Figure 5 shows a typical cable mounted float system configured for duplex lift station control.

USFilter offers kits and individual parts needed for cable mounting 9G floats.

- **SS Cable Suspension kit (P/N 6014400xxx)** – Kit contains a heavy duty, 1/8" stainless steel cable and 4 stainless steel u-bolts (2 for connecting the anchor and 2 for a loop at the top of cable). The kit comes standard in 20' (601440020), 30' (030), 40' (040), 60' (060) and 80' (080) lengths. Non-standard lengths are available as a special order.

- **15# Anchor (P/N xxx333-100)** – Plastic coated, cast iron anchor with integral stainless steel connecting ring.

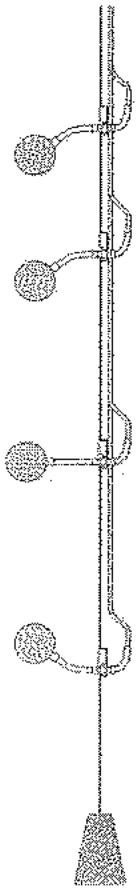

Figure 6 – Typical Cable Mounted Application

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- **9G Float to Cable Clamp (P/N 6012120001)** – Stainless steel clamp that mounts the float to the suspension cable. Clamp is normally included with each float (see figure 7)
- **Complete Float/Cable/Anchor Kit (P/N 803211000x)** – Complete kit for cable mounting 5 floats. Kit includes 30' (8032110003) or 60' (8032110006) of stainless steel cable, 4 stainless steel u-bolts, 15# Anchor, wall mount suspension bracket, and 5 float to cable clamps.

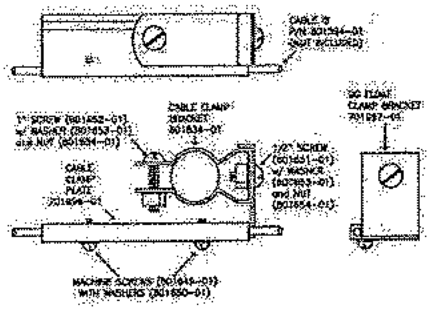

Figure 7.
Stainless Steel Float to Cable Clamp
P/N 6012120001

How to Cable Mount a Float

1. Connecting the anchor. Mount the anchor to the cable by stringing the cable through the anchor's mounting eye and securing the cable to itself using two of the four stainless steel u-bolts.

2. Connecting the upper support (customer applied). Pass the cable through the customer supplied mounting ring at the top of tank and secure the cable to itself using the remaining two SS u-bolts. See Figure 8.

3. Mark the float's operating point on the cable. Often, the floats are mounted to the cable as the cable rests on the ground. The cable is then dropped into the tank and the floats are wired to the control panel. In order to position the float correctly, mark the cable at the desired float-mounting levels before clamping the floats to the cable.

4. Assemble the float's cable mounting clamp. Each float has a cord gripping tube crimped to its jacketed cable. The float's cable clamp is assembled around the cord grip tube by following the instructions provided with the clamp. The clamp is then finger tightened to secure the float to the suspension cable. See Figure 8.

5. Tighten the assembly. While holding the float at the proper operating point on the suspension cable (see #3 above), tighten the nuts securely.

6. Secure the cable. Attach the float's jacketed cable to the stainless steel suspension cable by using the cable ties included with each float.

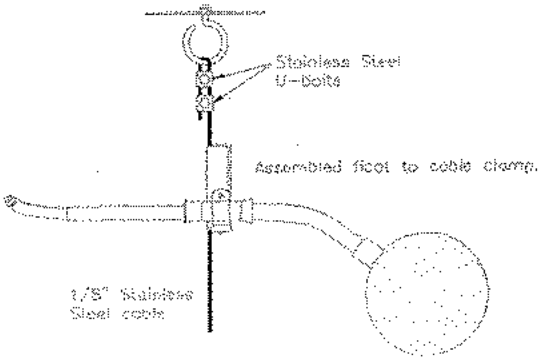

Figure 8 – Cable Mounted Float

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Wiring to the Controller

Connect the black and white cable conductors to the proper terminals as shown on the project-wiring diagram for the equipment installation. Connect the green conductor of each float to a grounding bar, and run a ground connection as required by the National Electric Code.

Each float has a green wire as an internal ground and THIS MUST RUN TO A SUITABLE EXTERNAL GROUND, per N.E.C.

Be sure to properly seal conduits to prevent the infiltration of gases.

Testing Procedures

Follow the operating instructions furnished with the control panel. If the float circuit Pump Controller/Alternator has a "closed-open-automatic" toggle-type test switch, which stimulates the operation of the float circuit, leave the test switches in the "automatic" position after completion of testing.

Observe the functioning of the complete system through several normal operating cycles to be certain all work is complete and the system operates properly.

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Product Specification

Cmr25 Transducer Isolation Amplifier Module

The CMR25 is a transducer input isolation amplifier module. It provides a minimum of 750 volts of isolation between the voltage input of a controller and the signal source. Transient suppression is also provided. The module is in applications where differential signals are to be interfaced to single ended inputs or to eliminate ground loops in a system.

Part Number	Description	
6013920002	Cmr25 Transducer Isolation Amp 6.25v Exc	
6013920003	Cmr25 Transducer Isolation Amp 12v Output	
6013920004	Cmr25 Transducer Isolation Amp 24v Output	

Specifications

Electrical

Power supply: 10.5-13.8VDC @ 30mA Max for –01, 02, 03. 70mA Max –04.

Signal dynamic range: 0 - 6.5VDC

Linearity: Better than .5%

Isolation: 750VDC continuous

Transient suppression: Current limiter, HF filter, TVS diode

Physical

Dimensions: 3"L x5"W x.6"H

Terminal Description and Normal Operation

Terminal 1: Transducer excitation/supply

Terminal 2: Transducer common

Terminal 3: Transducer signal input

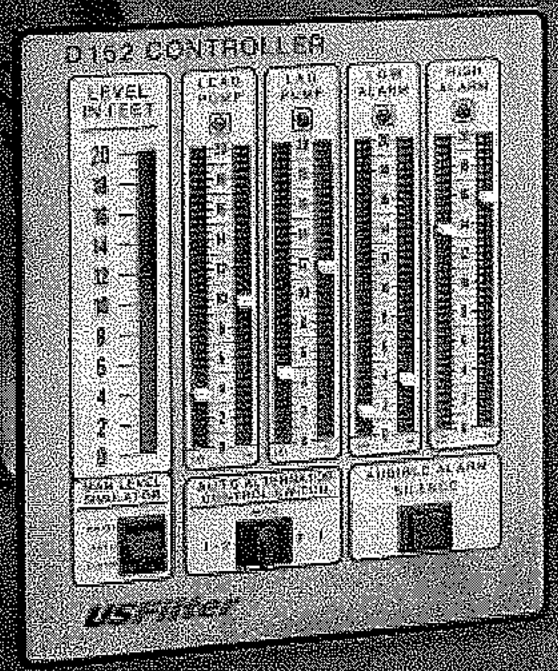
Terminal 4: Power supply input. +10.5 – 13.8VDC @ 30mA

Terminal 5: Common for power and signal

Terminal 6: Signal output

Calibration/Testing Procedures

Full scale adjust: Coarse and fine pots preset for a gain of 1.



USFilter

VIEW-AT-A-GLANCE™ CONTROLLERS: EFFORTLESS CONTROL, ADVANCED CAPABILITIES.

D150-SERIES VIEW-AT-A-GLANCE

CONTROLLERS

Features In Brief

- *Simple*
- *Reliable*
- *Cost-effective*
- *Field configurable*
- *No programming*
- *Alarm annunciator logic*
- *Manual level simulation*

Some things just get better with age and our patented D150 series "View-At-A-Glance™" family of controllers is no exception. These controllers offer robust, tried-and-true technologies that have been used successfully for more than 15 years on several thousand applications.

The D150 series controllers are designed specifically for pump station applications and offer a simple, reliable, and cost-efficient pump control platform that has become a favorite with operators across the country.

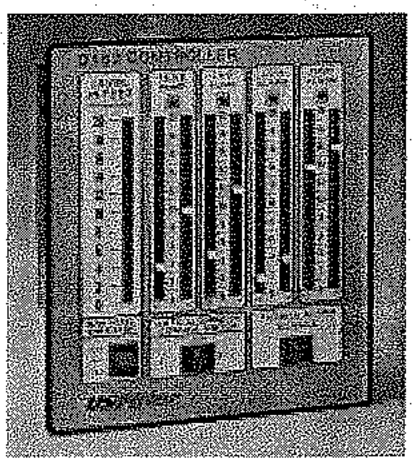
The controller comes in several configurations, allowing a specialized controller that is designed specifically for your application, whether it is 1, 2, 3 or even up to 8 pumps. Because controllers can be selected for pump up or pump down applications, they can be used for both water (typically pump up) and wastewater (typically pump down) applications.

Each controller works with a wide range of available level/pressure sensors such as general purpose gauge or differential pressure transducers, submersible level/pressure transducers, air-purge "bubbler" transducer level-sensing systems, ultrasonic level transmitters or any other sensor that produces a linear level-proportional analog (1-5 VDC or 4-20 mADC) output.

Each controller has built-in scaling and offset adjustments permitting control over the desired operating range of the measured process. Each controller provides adjustable analog input filtering (quelling) that eliminates the effects of undesirable signal surges that can result from electrical or process disturbances.

The process variable (Level) is displayed on a pre-scaled, 4-inch high, 40-segment LED vertical display that gives quick, accurate level reference, even from a distance. Each controller can be furnished with a 0-10, 0-20, or 0-40 increment pre-scaled display range, allowing the resolution required for precise level and alarm control.

Each controller derives control and alarm signals through the use of easily adjustable programming pins plugged into 40-position setpoint columns that run parallel to the level display. Each control and alarm point has two setpoint



columns (separate on and off) providing full ranging adjustable differential. The activation of a control or alarm setpoint illuminates an LED showing the associated setpoint status.

Because everything is viewable from the front of the controller, an operator can gain quick and easy setpoint reference without scrolling through multiple displays or performing complicated multi-step sequences to make setpoint adjustments.

Each D150 series controller has built-in analog signal forcing capability, providing a unique diagnostic tool that allows simulation of the process variable to verify proper controller operation. The signal forcing function is easily enabled from the front of the controller. To prevent inadvertent level simulation, the unit automatically returns to normal when not in use.

To round off the D150 series controllers, each features built-in alarm horn logic with a front-panel-mounted silence push button. This logic can also work with remote push button stations that may be mounted on the exterior of an outdoor-rated control panel, allowing silencing of an external alarm horn without having to open an outdoor-rated control panel or gain access to a secured structure.

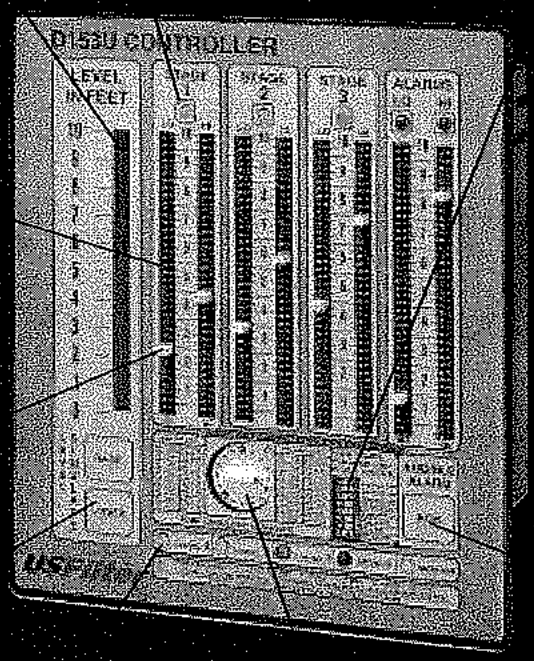
(See the Model Selection Guide at the end of the brochure to assist you in determining the best controller for your application.)

THE FRONT DISPLAY DEFINED

Stage Operation LED Indicators: The five LED's across the top of the controller show the operation of the differential level pump control and abnormal level alarm stages.

40-Segment LED Bar Graph Display: Indicates level over a range of 0-10 feet, 0-20 feet or 0-40-feet in 3-inch, 6-inch or 12-inch increments, respectively. (Calibration other engineering units divisible by 40 also available.)

DIP Switches (D153U Only): These are used to enable and disable controller modes of operation, permitting necessary expanded functionality for proper operation of pumps.



Programming Receptacles: The pins plug into these 8 tracks to control 3 pumps and high and low alarm levels. The receptacles are calibrated to align with the LED display.

Setpoint Pins: Programming pins for adjusting pump and alarm operating levels are easy to set and easy to see, even at a distance.

Audible Alarm ACK Button: Allows the operator to silence the audible alarm output circuit.

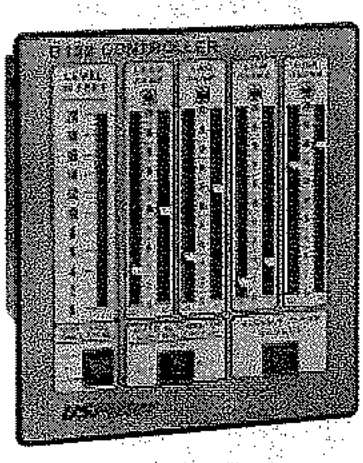
Level Simulation: "Raise" and "Lower" push-buttons allow safe, convenient testing of station pumps and level alarms without the danger of leaving the controller in non-automatic mode.

Selector: Controls the choice of pump operating sequences, allowing fixed and alternating modes of operation.

Control/Alarm/Monitor LED Indicator (D153U only): The five LED's at the bottom of the display show the operation of pump control, alarm and monitor relay drive outputs.

D152 TWO-CIRCUIT

CONTROLLER/ALTERNATOR



D152 Features In Brief

- *Duplex pump down control*
- *Duplex alternator*

D152 Product Specifications:

Power Supply Input: 120 VAC @ 20 VA (can be configured for 12 VDC operation)

Power Supply Output: 13.8 VDC @ 250 mA w/120 VAC input

Analog Input: 4-20 mA (250 ohm load), 1-5 VDC (0.5-6 VDC)

Calibration Adj: 10-100% of analog input range for full scale display; 0-90% of analog suppression/offset

Quelling: 0-90 second full range input excursion

Control Inputs: Active low w/Passive Pull-up (Return to input common)

Alarm Horn Outputs: Open collector 30 VDC @ 250 mA

Dimensions: 8½" high x 7½" wide x 3½" deep

Environmental: Operating temperature 0 to 165° F

Humidity: 10-95% non-condensing

The D152 is simplicity at its best with 'View-At-A-Glance™" design that allows quick and easy indication of system configuration/status and adjustment of operational parameters.

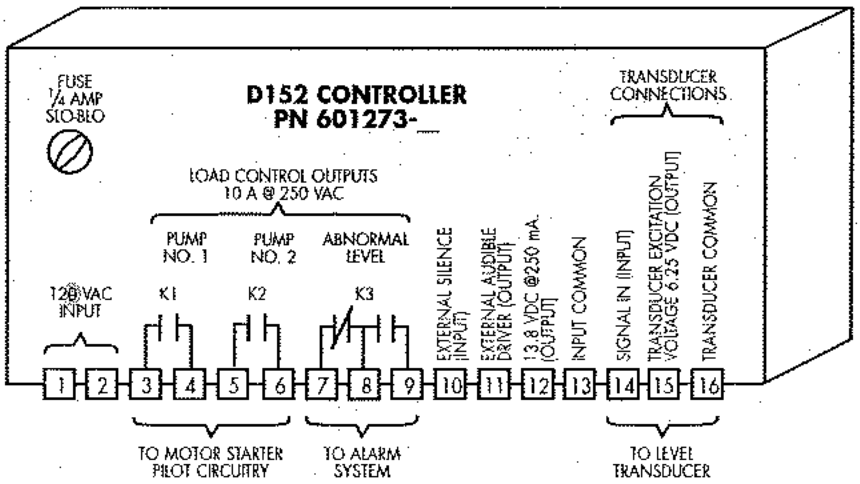
The D152 pump and alarm controller is an excellent choice for control of duplex sewage or stormwater lift pump stations or other similar process applications requiring pump down control. Because of its built-in capabilities and compact design, the controller is economical, space-saving, and easily integrated into new pump stations or retrofitted into existing pump station control systems.

The D152 provides full-range, differential control of two pumps plus High and Low (Abnormal) level alarm in response to a 1-5 volt DC or 4-20 mADC level-proportional signal as provided by an external sensor. The controller works with a wide range of available level sensors such as a submersible level transducer, an air-purge "bubbler" transducer level-sensing system, ultrasonic level transmitter or any other sensor that produces a linear, level-proportional analog output.

The D152 comes complete with built-in duplex alternator allowing pump sequencing in fixed or alternating modes. Sequence selections allow equalization of pump usage or, in conjunction with setpoint positioning, can be used to take a pump out of service. Pump sequence selection is viewable and adjustable through the front-mounted 3-position toggle switch.

The D152 controller is easily interfaced with motor starter pilot or station alarm circuitry through built-in relay contact closure outputs rated at 10 amps @ 120 VAC.

The D152 controller operates on 120 VAC power and provides 13.8 VDC @ 250 mA off-board power to power peripheral devices including alarm horns or interposing relays. All wiring terminations are located on the back of the controller with compression-type terminal blocks capable of securing two or fewer 12 AWG wires. The controller is UL-listed.



SUGGESTED SPECIFICATIONS

D152 DUPLEX PUMP CONTROLLER

The wet well control system shall provide automatic duplex pump down mode control and level alarm detection based on wet well level excursions as sensed by remote sensor.

The pump/alarm Controller shall accept a single, level-proportional analog input signal (1-5 VDC or 4-20 mADC) and provide level-differential automatic operation of the pumps and alarms. The Controller shall include: signal spanning, offsetting and adjustable "quelling" (rate-of-change limiting).

The Controller shall display the sensed control level on a forty-segment LED bar graph display. The level shall be displayed in a *(0-10)(0-20)(0-40)* foot range with *(3")(6")(12")* resolution.

Directly aligned with the calibrated LED bar graph display shall be eight vertical receptacles with programming pins and adjacent range scales to match the calibrated bar graph giving full-range, level-differential, On/Off operation of 2 pumps and high and low level alarms from the sensed level excursion. The receptacles and programming pins shall be gold-plated to ensure reliable, long-term operation. A front mounted LED indicator shall be provided in conjunction with each differential control/alarm stage to show when the stage output is activated.

A three-position, spring-return-to-center "raise-auto-lower" level simulation switch shall allow the manual creation of a simulated level signal when the switch is raised or lowered from the center "auto" position. The switch shall automatically return to normal mode to eliminate the possibility of leaving the station in a "non-automatic" condition.

The Controller shall include abnormal level alarm annunciation circuitry with a front accessible alarm silence pushbutton and rear terminal block connection for an external audible alarm and silence pushbutton.

Upon power-up, the Controller shall go through a timing routine which allows the analog signal and display to stabilize before any control or alarm outputs are enabled. After the stabilization period, the control circuits of the Controller shall be sequentially enabled on a timed-step arrangement, providing staggered starting of the pumps.

The Controller shall have built-in front panel accessible three position (1-2, Auto, 2-1) pump sequence selection switch allowing both fixed and alternating sequences.

The Controller shall operate on 120 VAC power and shall be protected from over current through a rear-accessible, extractor-type input power fuse and power line transient protection. The input power and the control outputs shall be wired to screw/clamp barrier-type terminals on the back of the controller housing able to accept one or two AWG 12 or smaller conductors per terminal. The Controller shall incorporate the pump control output load relays and a common abnormal level alarm output load relay with dry contacts wired to terminals rated 10 amp. at 240 VAC.

It is the specific intention of this specification that the control system offer simplicity and reliability without the need of specialized tools or programming knowledge. Systems utilizing controllers that do not allow viewing of all specified operational parameters or generic programmable logic controllers with custom software are specifically precluded by this specification and will not be acceptable.

The controller shall be a USFilter Control Systems Model D152 Duplex Pump Controller.

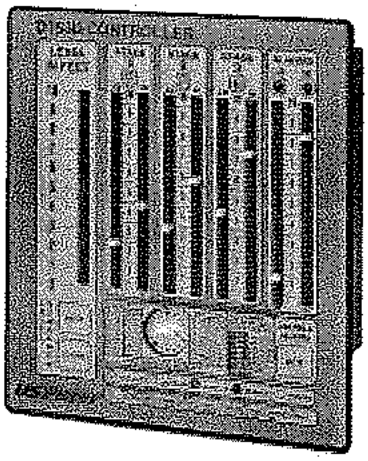
D153 TWO- OR THREE-CIRCUIT

CONTROLLER/ALTERNATOR

The D153 Pump and Alarm Controller provides level-responsive automatic pump control for up to three pumps and automatic alternation for two of them. The D153 is similar to the D152 except that the High and Low level alarm circuitry is separated and available either for independent High/Low use or for control purposes. The third control stage (used for Low alarm in the D152) operates relay K3 (otherwise used as a failsafe common alarm output device). Each pump control circuit has a 10 amp at 250 VAC-rated control contact brought to job connection terminals. The D153 operates on 120 VAC or 12 VDC power.

D153U TWO- OR THREE CIRCUIT

CONTROLLER/ALTERNATOR



D153U Features In Brief

- *Triplex Controller/Alternator*
- *Pump up or pump down modes*
- *Output activation and controller health indicators*
- *Output activation and controller health indicators*
- *Battery backup w/charger*

The D153U (universal) controller is the most sophisticated and capable controller in the D150 family. Even though it is capable of performing many different functions, with more than 64 selectable modes of operation, it shares the "View-At-A-Glance™" characteristics of simple and user-friendly configuration and operation. You can't find this much functionality in any other controller in its class.

The desired functionality is easily configured through the placement of front-panel-mounted switches and setpoint pins. The unit requires no programming knowledge or any special testing, calibration or diagnostic tools. You just set it up and go. The controller has additional built-in indicators and controller monitoring diagnostics that tell you if the controller is operating properly.

The D153U pump and alarm controller is a workhorse that provides full-range, differential control, pump up or pump down mode operation of 1, 2 or 3 pumps plus High and Low level alarm in response to an 1-5 volt DC or 4-20 mADC level-proportional signal as provided by an external sensor. This makes it the preferred controller for booster pump stations, lift stations with two or three pumps or other similar process applications. Because of its built-in capabilities and compact design, the controller is economical, space-saving, and easily integrated into new pump stations or retrofitted into existing pump station control systems.

The D153U gives you more choices to operate the pumps in the mode or sequence that best meets your needs. The controller has a built-in alternator providing 5 basic modes of operation with 32 selectable pump-sequencing schemes that can be changed on the fly. The operation mode and pump sequencing scheme are viewable and easily adjustable through the front-panel-mounted 16-position rotary switch. The following operating modes are supported by the D153U:

Fixed. The pumps operate in the same sequence during each cycle.

Auto-Rotary. This mode automatically advances by one the operating sequence of the selected pumps each time all pumps shut off.

FOFO (first on, first off): This operating sequence minimizes the starting frequency of each pump and equalizes usage of the pumps. When the program calls for an additional pump, the controller automatically turns on the pump which has had the longest "rest." When the program calls for one less pump, it automatically turns off the one which has run the longest.

UOFO (utilize one, favor others): This sequence uses a selected lead pump up to a designated number of rated starts per hour (ranging from four to 18, in increments of two). If the lead pump has been used to its maximum SPH, the other pumps are brought in and automatically alternated. Each pump serves in the lead position once every 24 hours to keep it "fresh."

VLC (variable level control): This capability provides variable-start level control in a responsible, level-limited fashion. It uses Control Stage 1 as a low-level "enable" function and Stage 2 as a high-level "must run" control, and it turns on the lead pump at varying times after its last operation. This prevents "bathtub ring" on the wet well walls. In a three-pump program, the third pump operates at the same elevation as the high level alarm.

The D153U controller accepts unpowered input contacts to advance the automatic pump alternator a single step and to inhibit automatic pump control from remote devices that detect and produce outputs representing power failure, low level/suction pressure and high pressure lockouts, to name a few.

The D153U controller can be powered by an off board 12 VAC or 10.5-15 VDC power supply and provides 13.8 VDC @ 500 mA for powering off board peripheral devices including alarm horns or interposing alarm and control relays. The controller is suitable for use in panels that requires UL 508 or 913 industrial control panel label.

The controller can be battery backed up through built-in battery interface circuitry allowing automatic switch over when AC power fails. To ensure the battery is always fresh, the controller has built-in automatic battery charging circuitry.

All wiring terminations are located on the back of the controller. To facilitate field service, the terminal blocks are removable plug-in compression-type terminal blocks capable of securing two or fewer 14 AWG wires.

Front-Accessible Dip Switches

One of the beneficial features of the D153U is the placement of the configuration switches on the front panel. Eight dip switches are included and their functions are described in the table.

SWITCH	FUNCTION
SW1-SW3	These three switches combine to allow a starting frequency limit of the lead pump in the UOFO mode from 4 to 18 starts per-hour.
SW4	Determines whether the D153U operates in a Pump-UP or Pump-DOWN mode. Pump-UP relates to a "keep full" need of a water reservoir while Pump-DOWN relates to a "keep pumped down" use in a sewage lift station wet well level-responsive situation.
SW5	Operates Control Stage 3 in the opposite mode from the rest of the Controller. This may be used: for example, in a water system ground reservoir situation where the D153U DIP Switch 4 would be "off" to provide "Pump-UP" control for two well pumps delivering water to the reservoir while the Switch 5 would be "on" to make Control Stage 3 "opposite" and used to provide low level cutout and higher level "return to service" protection for the high service pumps taking suction from the reservoir.
SW6	Determines whether or not the pumps are shut down in the event of AC power failure. This is used in situations where the level display and alarms might be battery-backed and continue in operation under power outage conditions. The pumps are starting interval limited (10 or 1 second) upon being returned to service.
SW7	Disables the low level alarm function in applications where a low level condition might be normal for extended periods of time, such as in stormwater pumping station collection sumps which are normally dry.
SW8	Determines whether the LEFT/RIGHT selection tables of the rotary PUMP OPERATING SEQUENCE selector are in service. This provides 32 selections when used with the 16-position rotary switch.

D153U Product Specifications:

Power Supply Input: 12 VAC @ 30 VA or 10.5-15 VDC @ 300 mA

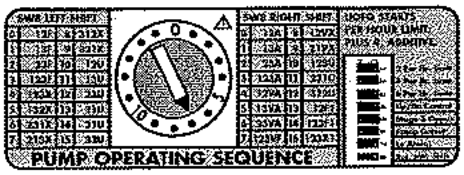
Power Supply Output: 13.8 VDC @ 300 mA w/12 VAC input

Analog Input: 4-20 mA (250 ohm load), 1-5 VDC (0.5-6 VDC)

Calibration Adj: 10-100% of analog input range for full scale display; 0-90% of analog suppression/offset

Quelling: 30-300 second full range input excursion

Control Inputs: Active low w/Passive Pull-up (Return to input common)

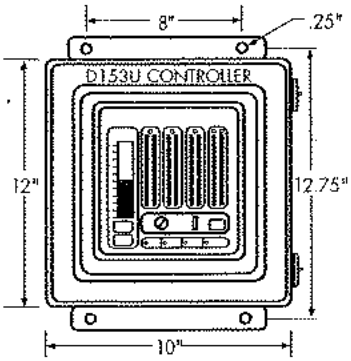


Control Outputs: Open collector 30 VDC @ 150 mA

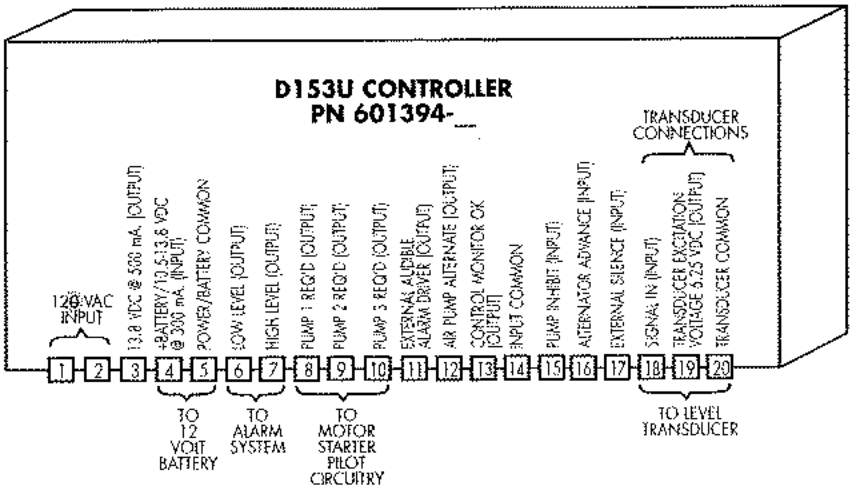
Dimensions: 8½" high x 7½" wide x 2½" deep

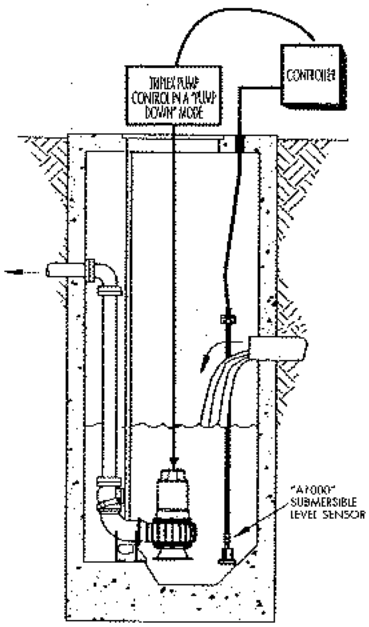
Environmental: Operating temperature 0 to 165° F

Humidity: 10-95% non-condensing



D153U Controller with power supply and output load relays mounted inside a NEMA 4X padlockable weatherproof enclosure.





Sewage or Stormwater Wet Well Level-Responsive 3-Pump Control

The control system shall provide automatic *(simplex/duplex/triplex)(pump up/pump down)* mode control and alarm level detection based on _____ level excursions as sensed by remote sensor.

The pump/alarm Controller shall accept a single, level-proportional analog input signal (1-5 VDC or 4-20 mADC) and provide level-differential automatic operation of the pumps and alarms. The Controller shall include signal spanning, offsetting and adjustable "quelling" rate-of-change limiting.

The Controller shall display the sensed control level on a forty-segment LED bar graph display. The level shall be displayed in a *(0/10)(0-20)(0-40)* foot range with *(3")(6")(12")* resolution.

Directly aligned with the calibrated LED bar graph display shall be eight vertical receptacles with programming pins and adjacent range scales to match the calibrated bar graph giving full-range, level-differential, On/Off operation of 1, 2 or 3 pumps and high and low level alarms from the sensed level excursion. The receptacles and programming pins shall be gold-plated to ensure reliable, long-term operation. A front mounted LED indicator shall be provided in conjunction with each differential control/alarm stage to show when the stage output is activated. To help facilitate system troubleshooting, the controller shall have LED indicators depicting the status of the control outputs, alarm output and controller operational status.

The Controller shall have "raise-lower" level simulation capability and shall allow the manual creation of a simulated level. The level measurement shall automatically return to normal mode to eliminate the possibility of leaving the station in a "non-automatic" condition.

The Controller shall include abnormal level alarm annunciation circuitry with a front accessible alarm silence pushbutton and rear terminal block connection for an external audible alarm and silence pushbutton.

Upon power-up, the Controller shall go through a timing routing which allows the analog signal and display to stabilize before any control or alarm outputs are enabled. After the stabilization period, the control circuits of the Controller shall be sequentially enabled on a timed-step arrangement, providing staggered starting of the pumps.

The Controller shall provide a multi-mode pump sequencing capability allowing for a minimum of 32 different alternation/control sequences to establish pump control sequencing requirements allowing for maintenance and system wear determination. Selected alternation sequence indication and operator adjustments shall be possible from the front of the controller. The Controller shall support the following modes of operation as a minimum: Fixed, Auto/Rotary, First-On/First-Off (FOFO), Utilize One/Favor Others (UOFO) and Variable Level Control (VLC) sequences.

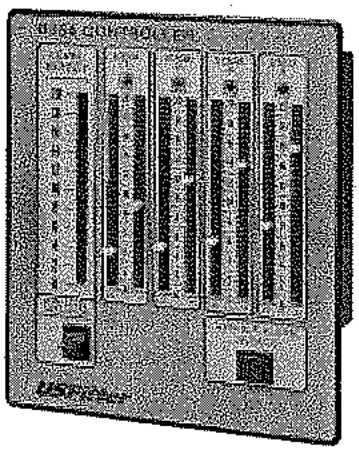
UOFO operating sequences utilize the selected lead pump up to its maximum allowable starts per hour as established (4 to 18 starts per hour) by operator adjustment. When the lead UOFO pump is called for operation before its allowable time, the control system shall use the remaining pumps on an automatically alternated basis to avoid excessive use of the selected lead pump. The UOFO alternator shall place each of the non-lead pumps in the lead position approximately once every twenty-four hours to keep the pumps "fresh." Upon excessive use of the selected lead UOFO pump the Controller shall flash the Stage 1 indicating LED to show such unintended operation.

VLC operating sequences shall be used in conjunction with the standard Fixed, Auto/Rotary or FOFO alternation schemes and shall provide a variable (rather than fixed) point at which pump operation begins.

The Controller shall provide utility input circuits at job connection terminals for external advance of the pump operating sequence, for inhibiting automatic pump operation and for acknowledging the audible alarm driving circuitry.

It is the specific intention of this specification that the control system offer simplicity and reliability without the need of specialized tools or programming knowledge. Systems utilizing controllers that do not allow viewing of all specified operational parameters or generic programmable logic controllers with custom software are specifically precluded by this specification and will not be acceptable.

The Controller shall be a USFilter Control Systems Model D153U Triplex Pump Controller.



D154 Features In Brief

- *Independent setpoint operation*
  - *Active on rise*
  - *Active on fall*
- *Four control points*

The D154 controller is simple, reliable and functional. The controller's basic function is to monitor a 1-5 volt DC or 4-20 mADC level-proportional signal, as provided by an external sensor, and compare this value to four full-range, differential setpoints and provide output for activation of interposing 12 VDC relays that can be used to activate pumps, valves or alarms.

Each differential setpoint can be configured for active on fall (pump up/low level) or active on rise (pump down/high level) mode operation. Outputs used for high or low level alarm can be input to the controller alarm circuitry for activation of alarm horn output that can be acknowledged with the front-panel-mounted audible silence pushbutton.

The arrangement of the level display and setpoint adjustment pins allows easy setting and viewing of all control adjustments. The simple-to-use interface allows the operator to easily change operating sequences and test setpoint adjustment via an integral simulation switch.

The operator-friendly D154 controller makes it a great choice for applications that require up to 4 points of control from one analog variable, as is often required in a typical small water distribution system.

An example application is a small water system or a remote water distribution zone that controls the level of a reservoir via a water source (well pump(s) or valve) that is called into service to fill the reservoir. The controller would also provide high and low level alarm outputs for activation of an alarm horn/system and a fourth output that would be used to provide cutout/restore functions to a booster or high service pump system that is drawing water from the reservoir.

The D154 controller accepts unpowered input contacts to inhibit automatic pump control from remote devices that detect and produce outputs representing power failure, low level/suction pressure and high pressure lockouts, to name a few.

A 10.5-15 VDC off-board power supply powers the D154 controller. All wiring terminations are located on the back of the controller. Terminal blocks are compression-type, capable of securing two or fewer 12 AWG wires. The controller is suitable for use in panels that require UL 508 or 913 industrial control panel label.

Consult factory for suggested specifications.

D154 Product Specifications:

Power Supply Input: 10.5-15 VDC @ 400 mA

Power Supply Output: 13.8 VDC @ 300 mA

Analog Input: 4-20 mA (250 ohm load), 1-5 VDC (0.5-6 VDC)

Calibration Adj: 15-100% of analog input range for full scale display; 0-85% of analog suppression/offset

Quelling: 0-90 second full range input excursion

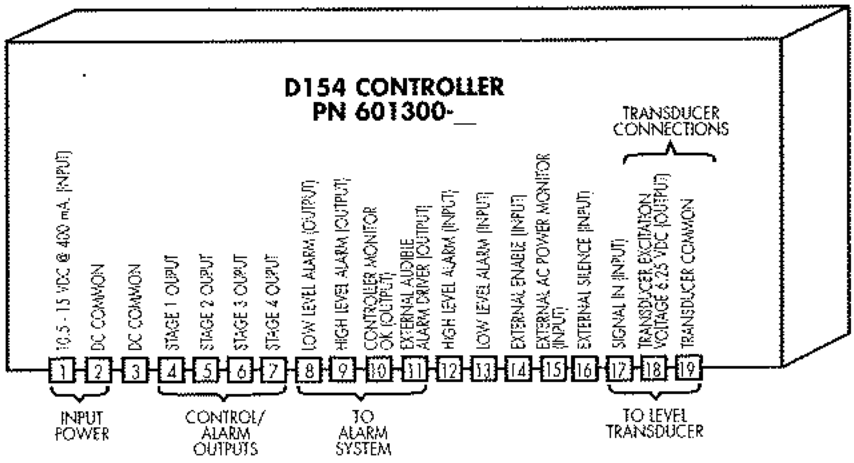
Control Inputs: Active low w/Passive Pull-up (Return to input common)

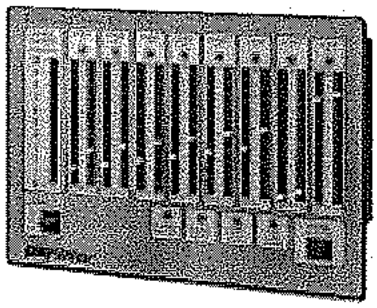
Outputs: Open collector 30 VDC @ 250 mA

Dimensions: 8 1/2" high x 7 1/2" wide x 3" deep

Environmental: Operating temperature 0 to 165° F

Humidity: 10-95% non-condensing





D158 Features In Brief

- *Independent setpoint operation*
  - *Active on rise*
  - *Active on fall*
- *Eight control points*
- *High and Low Level Alarm Indicators*
- *External AC power and enable status indicators*

D158 Product Specifications:

Power Supply Input: 10.5-15 VDC @ 400 mA

Power Supply Output: 13.8 VDC @ 300 mA

Analog Input: 4-20 mA (250 ohm load), 1-5 VDC (0.5-6 VDC)

Calibration Adj: 15-100% of analog input range for full scale display; 0-85% of analog suppression/offset

Quelling: 0-90 second full range input excursion

Control Inputs: Active low w/Passive Pull-up (Return to input common)

Outputs: Open collector 30 VDC @ 250 mA

Dimensions: 8½" high x 12" wide x 3" deep

Environmental: Operating temperature 0 to 165° F

Humidity: 10-95% non-condensing

The D158 expands the possibilities without compromising simplicity. The controller's basic function is to monitor a 1-5 volt DC or 4-20 mADC level-proportional signal, as provided by an external sensor, and compare this value to eight full-range, differential setpoints and provide output for activation of interposing 12 VDC relays that can be used to activate pumps, valves or alarms.

Like the D154, each differential setpoint can be configured for active on fall (pump up/low level) or active on rise (pump down/ high level) mode operation. Outputs used for level alarm can be input to the controller alarm circuitry for activation of low alarm horn output acknowledged from the front-panel-mounted audible silence pushbutton. Complementing the alarm circuitry logic are front-panel-mounted LED indicators for High and Low Level Alarm.

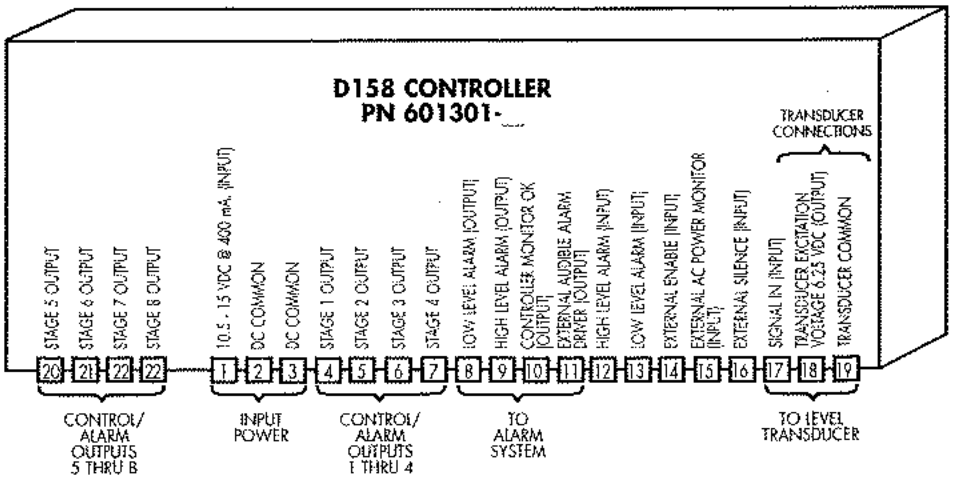
The arrangement of the level display and setpoint adjustment pins allows easy setting and viewing of all control adjustments. The simple-to-use interface allows the operator to easily change operating sequences and test setpoint adjustment via the integral simulation switch.

The expanded functionality of the D158 controller makes it a great choice for applications that require up to 8 points of control from one analog variable.

An AC power sense input is provided with a front-panel-indicating LED that can work with an optional external power-monitoring device. The activation of this input will illuminate the light and disable the controlled equipment. When AC power is restored, the controller goes through a power up routine and reenables the controlled equipment in a predetermined adjustable time step-sequencing manner to eliminate simultaneous starting of equipment.

The D158 controller has an enable input that permits remote inhibit/ deactivation of the control outputs. A dedicated, built-in LED indicator is provided to indicate the status of the enable input.

A 10.5-15 VDC off-board power supply powers the D158 controller. All wiring terminations are located on the back of the controller. Terminal blocks are compression-type, capable of securing two or fewer 12 AWG wires. The controller is suitable for use in panels that require a UL 508 or 913 industrial control panel label.



To assist you in locating the controller best suited for your application, use the following table.

Controller Model	Max # of Pumps	Pump Down	Pump Up	Built-In Alternator	Separate High & Low Level Alarm Outputs	Common Water & Wastewater Applications
D152	2	Yes	No	Yes	No (Common only)	Lift or transfer pump stations
D153	2-3	Yes	No	Yes--2 pumps	Yes–2 pump mode	Lift or transfer pump stations
D153U	3	Yes	Yes	Yes	Yes	Lift or transfer pump stations Booster pump stations Well field or raw water pump stations
D154	2-4	Yes	Yes	No*	Yes – when 2 or fewer pumps controlled	Booster pump stations & small water dist. systems Well field or raw water pump stations
D158	6-8	Yes	Yes	No*	Yes – when 6 or fewer pumps controlled	Large booster pump stations Large well field or raw water pump stations Small water distribution system

** If alternation is required, the D154 or D158 controller can utilize USFilter Control Systems alternators Model CB2D, CB23, CB234, and CB345 for alternation of up to 5 pumps.*

DESCRIPTION	PART NUMBER
D152 level display/setpoint control/alternator; 2 pumps, 0-10' display, pump down	601273-21
D152 level display/setpoint control/alternator; 2 pumps, 0-20' display, pump down	601273-22
D152 (10') in NEMA 1 enclosure w/A1000 GSCL transducer (20' cable)	601419-01
D152 (10') in NEMA 1 enclosure w/A1000 GSCL transducer (20' cable) and ISI-3	601419-03
D152 (20') in NEMA 1 enclosure w/A1000 GSCL transducer (30' cable)	601419-09
D152 (10') in NEMA 4X fiberglass encl w/window, A1000 GSCL (20' cable)	601419-25
D152 (20') in NEMA 4X fiberglass encl w/window, A1000 GSCL (30' cable)	601419-33
D152 (10') in NEMA 4X w/window, 2 H-O-A, A1000 GSCL (20' cable)	601419-24
D153 level display/setpoint control/alternator; 2 pumps, 0-10' display, pump down	601304-11
D153 level display/setpoint control/alternator; 2 pumps, 0-20' display, pump down	601304-12
D153U display/setpoint control/alt; 2/3 pumps, 0-10' display, pump up/down	601394-10
D153U display/setpoint control/alt; 2/3 pumps, 0-20' display, pump up/down	601394-20
D153U display/setpoint control/alt; 2/3 pumps, 0-40' display, pump up/down	601394-40
D153U (10') in NEMA 1 enclosure, A1000 GSCL transducer (20' cable)	601421-01
D153U (20') in NEMA 1 enclosure, A1000 GSCL transducer (30' cable)	601421-09
D153U (10') in NEMA 4X fiberglass encl w/window, A1000 GSCL (20' cable)	601419-17
D153U (20') in NEMA 4X fiberglass encl w/window, A1000 GSCL (30' cable)	601419-25
D15x controller programming pins (quantity twelve (12))	801789-01
D154 level display/setpoint controller; 0-10' display	601300-11
D154 level display/setpoint controller; 0-20' display	601300-12
D154 level display/setpoint controller; 0-40' display	601300-14
D158 level display/setpoint controller; 0-10' display	601301-11
D158 level display/setpoint controller; 0-20' display	601301-12
D158 level display/setpoint controller; 0-40' display	601301-14

COMPLETE CONTROL CAPABILITIES

USFilter Control Systems offers a single, high-quality source for everything from simple level sensors to telemetry systems to complex system control engineering and software. Based in St. Paul, MN, USFilter Control Systems is part of United States Filter Corporation, the leading global provider of industrial, municipal and residential water and wastewater treatment systems, products and services.

As a major manufacturer/integrator with an extensive selection of specialized product lines in the areas of SCADA and telemetry, power equipment integration, automation and measurement, USFilter Control Systems is uniquely positioned to provide cost-effective, comprehensive solutions for water, wastewater, and process control and telemetry applications. Our products and services encompass the following:

- Complete design and engineering services
- Field services, including training and troubleshooting
- Autocon SCADA systems
- Consolidated Electric SCADA systems
- Microcat control and telemetry products
- Remote terminal units and central control units
- Control and monitoring software
- Process control and communications computers
- I/O boards, modems and power supplies
- Power equipment integration
- Programmable logic controller systems
- Programmable process controllers
- Controllers and controller/alternators
- Tank pump control systems
- Pressure/level controllers
- Pump flow and performance monitoring
- Flow switches and float switches
- Intrinsic safety barriers
- Level transducers and level sensors
- Pressure transducers

To find out more about how to put USFilter to work for you, contact us at

USFilter

Control Systems
1239 Willow Lake Boulevard
Vadnais Heights, MN 55110
800.224.9474 *phone*
651.766.2700 *phone*
651.766.2701 *fax*

For more information, visit our web site at

www.controlsystems.usfilter.com

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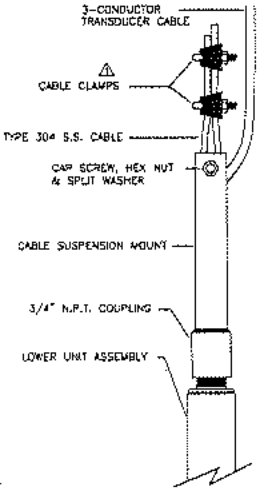
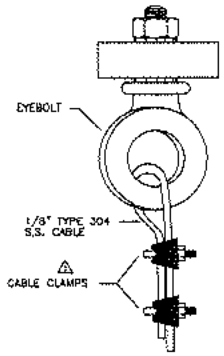
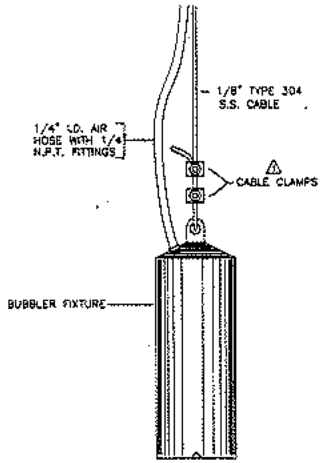
CS-VG-BR-0101



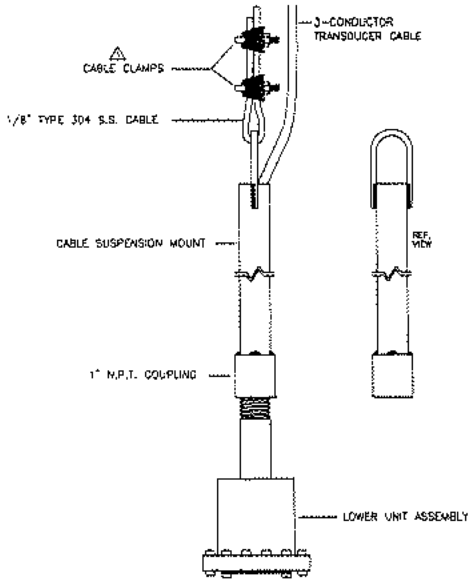
TYPICAL ASSEMBLY OF LOWER END OF SUSPENSION CABLE AND U-BOLT CLAMPS (60144000XX) TO BULLETIN A1200 MODEL 2410 LOWER UNIT SUSP. KIT (601360-LTS12)



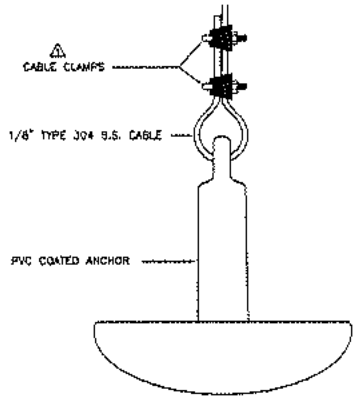
TYPICAL ASSEMBLY OF UPPER END OF SUSPENSION CABLE AND U-BOLT CLAMPS (60144000XX)



TYPICAL ASSEMBLY OF LOWER END OF SUSPENSION CABLE AND U-BOLT CLAMPS (60144000XX) TO BULLETIN A700 MODEL 230405 BUBBLER SUSPENSION KIT (601360BUB)



TYPICAL ASSEMBLY OF LOWER END OF SUSPENSION CABLE AND U-BOLT CLAMPS (60144400XX) TO BULLETIN A1000 MODEL 1570SC LOWER UNIT SUSP. KIT (601478D001)



TYPICAL ASSEMBLY OF LOWER END OF SUSPENSION CABLE AND U-BOLT CLAMPS (60144455XX) TO BULLETIN B100 MODEL CBM WEIGHT/ CABLE ASSEMBLY (601360DANC)

NOTES:
1. THE CABLE AND (4) CABLE CLAMPS ARE PART OF 60144000XX (XX DENOTES THE CABLE LENGTH). STANDARD CABLE LENGTHS ARE 30 & 60 FEET.

WARNING!!!

THE CABLE CLAMP U-BOLTS MUST BE INSTALLED CORRECTLY TO OBTAIN MAXIMUM HOLDING POWER. INSTALL U-BOLT SECTION OF CLIP ON DEAD OR SHORT END OF CABLE, AND SADDLE ON LIVE OR LONG END OF CABLE. WRONG INSTALLATION OF EVEN ONE CLIP REDUCES EFFICIENCY OF CONNECTION AS MUCH AS 40%. FOR MAXIMUM HOLDING POWER, CLIPS SHOULD BE INSTALLED 6 OR 7 CABLE DIAMETERS APART. NEVER USE CLIPS TO CONNECT TWO STRAIGHT LENGTHS OF CABLE.

2. UPPER CONNECTION OF THE CABLE CLAMPS ARE THE SAME AS THE LOWER CONNECTIONS SHOWN.
3. THIS DRAWING IS NOT DRAWN TO SCALE.
4. CUSTOM CABLE LENGTHS ARE AVAILABLE.

USFCS PDF No. 552 Rev.: 1-03

REV	DESCRIPTION	DATE	DWN	CHKD	APD	ECN
0	ISSUED FOR CONSTRUCTION	03/02	JVE	NRB	MRB	

DESIGNER JVE 03/02 · CHECKED NRB 03/02 · ENGINEER · MANAGER

TITLE: TYPICAL SUSPENSION CABLE ASSEMBLY INSTRUCTIONS

CLIENT:

USFilter — US FILTER CONTROL SYSTEMS, VADNAIS HEIGHTS, MN, PH. 651-784-2700

PROJECT	SIZE	DRAWING	SHEET	REV
CBM	D00	E12	1 OF 1	0

SCALE:

STD: J-0200-24X36C1 · INT. REF: · BAR = 1" AT PLOT SCALE

DRAWING NUMBER/FILENAME ASSIGNMENT

XXXXXXXX-YYY-EXX-XXX-YY

USFILTER PROJECT No.

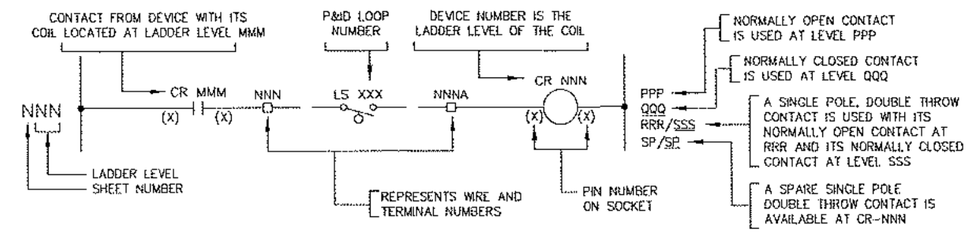
REVISION NUMBER A-99 (A-Z = APPROVAL ISSUE) (0-99 = CONSTRUCTION ISSUE)

SHEET NUMBER 001 TO 999

000 : GENERAL INFORMATION
001 : FIRST CONTROL PANEL
002 : SECOND CONTROL PANEL, ETC.
PIT3601 : FLOW INSTRUMENT LOOP DIAGRAM
LIT2202 : LEVEL INSTRUMENT LOOP DIAGRAM, ETC.

E00 TITLE DRAWING	E11 INSTRUMENTATION DATA SHEET	E22 CABLE TRAY ASSEMBLY DETAILS	E33 BUILDING GROUNDING PLAN	E44 ELECTRICAL BLOCK DIAGRAM
E01 ELECTRICAL LEGEND SHEET	E12 INSTRUMENTATION MOUNTING DETAILS	E23 CABLE TRAY ARRANGEMENT - PLAN	E34 SITE POWER / LIGHTING PLAN	E45 RISER DIAGRAM
E02 CONTROL PANEL ENCLOSURE LAYOUT	E13 SINGLE LOOP DIAGRAM	E24 CABLE TRAY ARRANGEMENT - ELEVATION	E35 BUILDING POWER / LIGHTING PLAN	E46 I/O LISTING
E03 CONTROL PANEL SUB-PANEL LAYOUT	E14 SINGLE LINE DIAGRAM	E25 CONDUIT PLAN	E36 GROUNDING AND LIGHTING PLAN	E47 LOGIC DIAGRAM
E04 CONTROL PANEL SCHEMATIC DIAGRAM	E15 MCC ELEVATION	E26 EMBEDDED CONDUIT PLAN	E37 GROUNDING DETAILS	E48 PARAMETER LISTING
E05 TERMINAL BLOCK OUTLINE	E16 SWITCHGEAR ELEVATION	E27 UNDERGROUND CONDUIT PLAN	E38 LIGHTING SCHEDULE	E49 PNEUMATIC / HYDRAULIC DIAGRAM
E06 NAMEPLATE SCHEDULE	E17 MCC ELEMENTARY DIAGRAM	E28 CONDUIT SCHEDULE	E39 LIGHTING DETAILS	E50 ELECTRICAL EQUIPMENT LIST
E07 ELECTRICAL BILL OF MATERIALS	E18 CONDUIT GENERAL ARRANGEMENT	E29 CABLE SCHEDULE	E40 HEAT TRACE DIAGRAM	E51 LADDER LOGIC PRINTOUT
E08 POINT-TO-POINT DIAGRAM	E19 CONDUIT & INTERCONNECTION DIAGRAM	E30 CABLE AND CONDUIT SCHEDULE	E41 HEAT TRACE SCHEDULE	
E09 SYSTEM NETWORK ARCHITECTURE DIAGRAM	E20 FIELD INTERCONNECTION DIAGRAM	E31 CONDUIT AND CABLE TRAY DETAILS	E42 HEAT TRACE DETAILS	
E10 INSTRUMENTATION LISTING	E21 POWER, CONTROL AND INSTRUMENT PLAN	E32 SITE GROUNDING PLAN	E43 PANELBOARD SCHEDULE	

LADDER NUMBERING CONVENTION AND COMPONENT IDENTIFICATION



DEVICE PREFIX INDICATES GENERAL DEVICE TYPE AS:

ALR = ALARM HORN, BELL OR BUZZER
CB = CIRCUIT BREAKER
CR = CONTROL RELAY
DIS = DISCONNECT SWITCH
FE = FLOW ELEMENT
FI = FLOW INDICATOR
FS = FLOW SWITCH
FT = FLOW TRANSMITTER
FU = FUSE
HS = SELECTOR/HAND SWITCH
HTR = HEATER
LA = LIGHTNING ARRESTOR
LE = LEVEL ELEMENT
LF = LINE FILTER
LI = LEVEL INDICATOR
LIC = LEVEL INDICATING CONTROLLER
LS = LEVEL SWITCH
LT = LEVEL TRANSMITTER
MS = MOTOR STARTER COIL
PI = PRESSURE INDICATOR (OR GAUGE)
PS = PRESSURE SWITCH
PT = PRESSURE TRANSMITTER
PWR = POWER SUPPLY
T = TRANSFORMER
TR = TIMER
TS = TEMPERATURE SWITCH
XL = PILOT LIGHT
ZS = LIMIT SWITCH

STANDARD WIRE COLORS :

BLACK = 480 VOLT AND UNSWITCHED AC CONTROL WIRING
WHITE = NEUTRAL
RED = SWITCHED 115 VAC CONTROL
BLUE = DC
BLUE/WHITE = DC COMMON
ORANGE = UNGROUNDED 24VAC
ORANGE/WHITE = 24VAC NEUTRAL
GREEN = GROUND
GREEN/YELLOW = INSTRUMENT GROUND
YELLOW = EXTERNALLY POWERED 115VAC
YELLOW/WHITE = EXTERNAL NEUTRAL

BLACK = SHIELDED SIGNAL POSITIVE
WHITE/CLEAR = SHIELDED SIGNAL NEGATIVE OR COMMON
RED = POSITIVE SUPPLY VOLTAGE IN 3-WIRE APPLICATION

ALL WIRES UNIQUELY TAGGED AT BOTH ENDS EXCEPT RIBBON CABLE.

SWITCH CONFIGURATIONS

ZS	NORMALLY OPEN CLOSE ON INCREASE	CR NNN	NORMALLY OPEN CONTACT OF A DEVICE LOCATED AT LEVEL NNN
ZS	NORMALLY OPEN HELD CLOSED	CR NNN	NORMALLY CLOSED CONTACT OF A DEVICE LOCATED AT LEVEL NNN
ZS	NORMALLY CLOSED OPEN ON INCREASE	FS	FLOW SWITCH
ZS	NORMALLY CLOSED HELD OPEN	TS	TEMPERATURE SWITCH
LS	FLOAT SWITCH	FTS	FOOT SWITCH
PS	PRESSURE SWITCH		MUSHROOMHEAD PUSHBUTTON
PS	DIFFERENTIAL PRESSURE SWITCH	TR	ON DELAY TIMED TO OPEN
TR	ON DELAY TIMED TO CLOSE	TR	OFF DELAY TIMED TO CLOSE
TR	OFF DELAY TIMED TO OPEN		

NOTE: SWITCH POSITION IS TO REFLECT THE NORMAL/DE-ACTIVATED STATE

TERMINAL AND WIRING SYMBOLOGY

NNN	TERMINAL IN USF PANEL
NNN	TERMINAL IN A DIFFERENT PANEL, FIELD DEVICE, OR MOTOR CONTROL CENTER
	WIRE WITH SHIELD
	PLUG-IN CONNECTOR
	PANEL/FACTORY WIRING
	FUTURE WIRING
	FIELD WIRING
	WIRES ARE CONNECTED
	WIRES ARE NOT CONNECTED
(NNN)	WIRE IS CONTINUED TO LADDER NNN
(NNN)	WIRE IS CONTINUED FROM LADDER NNN
[PBO]	INDICATES THE DEVICE SHOWN IS PROVIDED BY OTHER THAN USF
[F]	INDICATES A FIELD MOUNTED DEVICE

MISCELLANEOUS SYMBOLS

MCBX XXA	MAIN CIRCUIT BREAKER	3-PHASE MOTOR	PANEL GROUND
MCPX XXA	3-PHASE MOTOR CIRCUIT PROTECTOR	SINGLE-PHASE MOTOR	EARTH GROUND
	3-PHASE DISCONNECT	OL THERMAL ELEMENT ON MOTOR STARTER	ISOLATED INSTRUMENT GROUND (ISOL)
CBX	CIRCUIT BREAKER	H1 H3 H2 H4 X1 X3 X2 X4 TRANSFORMER	RE DUPLEX RECEPTACLE
FUX A	FUSE	SVX SOLENOID VALVE	ALR ALARM HORN
FUX A	FUSED SWITCH	D DIODE	POT
4	CHANGE NOTICE SYMBOL	D ZENER DIODE	HTR X WATTS HEATER
			R X OHMS RESISTOR
			C CAPACITOR

PILOT DEVICE CONFIGURATIONS

TYPICAL SELECTOR SWITCH

501	HS XXX OFF HAND AUTO XOO	REFERENCES SWITCH OPERATOR LOOP NUMBER OR LADDER POSITION; CONTACT CLOSED ONLY IN THE EXTREME LEFT HAND POSITION
502	OOX (501)	CONTACT CLOSED ONLY IN THE EXTREME RIGHT HAND POSITION; INDICATES THAT SWITCH XXX HAS ANOTHER CONTACT AT LEVEL 601
601	HS XXX 502 OXX	REFERENCES SWITCH OPERATOR LOOP NUMBER OR LADDER POSITION; CONTACT CLOSED IN RIGHT TWO POSITIONS ONLY
200	HS XXX	TYPICAL FOR MOMENTARY PUSH BUTTON SWITCH
300	XL XXX Y	PILOT LIGHT - PUSH-TO-TEST Y = COLOR: R = RED, G = GREEN, W = WHITE, A = AMBER, L = BLUE
400	XL XXX Y	PILOT LIGHT Y = COLOR: R = RED, G = GREEN, W = WHITE, A = AMBER, L = BLUE

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
G	INITIAL STANDARD RELEASE	02/22/02	TLB			
B	REVISIONS BASED ON PEEET TEAM INPUT	01/16/02	DD			
A	ORIGINAL ISSUE FOR PEEET TEAM SUBMITTAL	08/22/01	TLB			

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DESIGNER MDM	DATE 06/05/01
CHECKER	DATE
ENGINEER	DATE
MANAGER	DATE
FILE: STD-000 E01-001-00	
SCALE: N/A	

TITLE: ELECTRICAL LEGEND SHEET

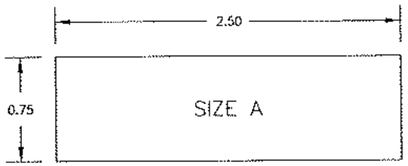
CLIENT: USFILTER STANDARD

USFilter CONTROL SYSTEMS, INC.
VADNAIS HEIGHTS, MN
PH. 651-766-7600

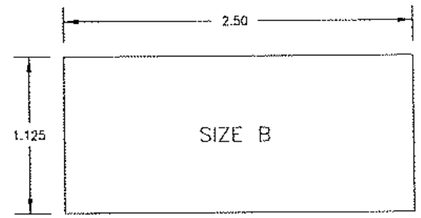
PROJECT	CODE	DRAWING	SHEET	REV
STD	000	E01	01 OF 01	0

STD: 0302-24X36D1 | INTL REF: | BAR = 1" AT PLOT SCALE

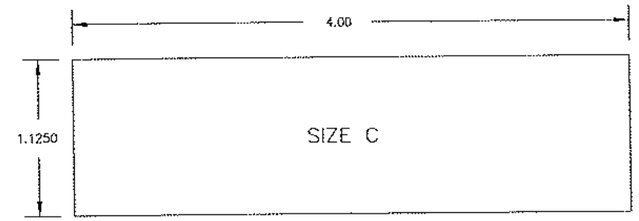
STANDARD NAMEPLATE DETAILS



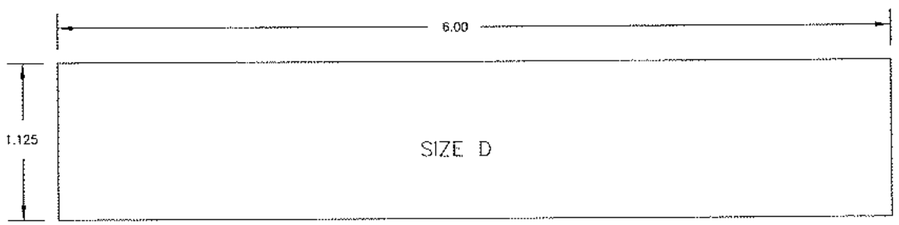
A-1 1/8" LETTERS 18 CHARACTERS PER LINE MAX 3 LINES
A-2 3/16" LETTERS 12 CHARACTERS PER LINE MAX 2 LINE



B-1 1/8" LETTERS 18 CHARACTERS PER LINE MAX 4 LINES
B-2 3/16" LETTERS 12 CHARACTERS PER LINE MAX 3 LINES
B-3 1/4" LETTERS 10 CHARACTERS PER LINE MAX 3 LINES
B-4 5/16" LETTERS 9 CHARACTERS PER LINE MAX 2 LINES



C-1 1/8" LETTERS 31 CHARACTERS PER LINE MAX 4 LINES
C-2 3/16" LETTERS 22 CHARACTERS PER LINE MAX 3 LINES
C-3 1/4" LETTERS 16 CHARACTERS PER LINE MAX 3 LINES
C-4 5/16" LETTERS 14 CHARACTERS PER LINE MAX 2 LINES

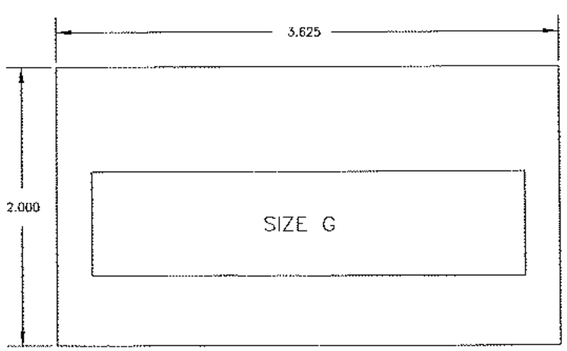


D-1 1/8" LETTERS 48 CHARACTERS PER LINE MAX 4 LINES
D-2 3/16" LETTERS 35 CHARACTERS PER LINE MAX 3 LINES
D-3 1/4" LETTERS 25 CHARACTERS PER LINE MAX 3 LINES
D-4 5/16" LETTERS 23 CHARACTERS PER LINE MAX 2 LINES

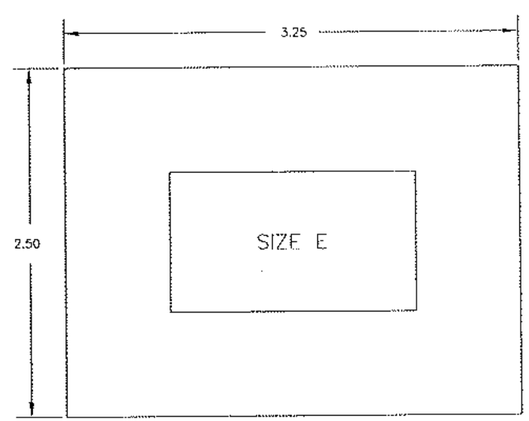
NOTE A: IF SCREWS ARE REQUIRED FOR FASTENING,
REDUCE THE CHARACTERS PER LINE BY 2 FOR 1/8" LETTERS
AND 1 FOR 3/16", 1/4", AND 5/16" LETTERS

NOTE B: UNLESS OTHERWISE SPECIFIED
WHITE LETTERS ON BLACK BACKGROUND

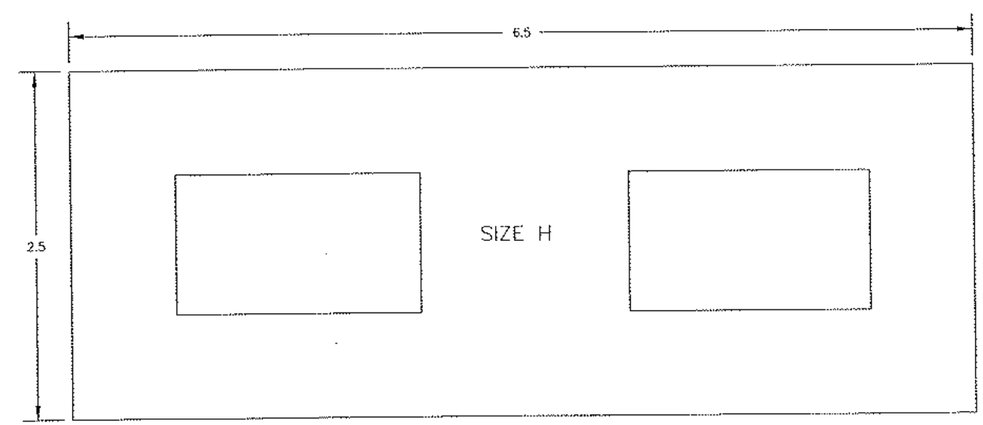
SPECIAL NAMEPLATE DETAILS



G-1 1/8" LETTERS 16 CHARACTERS PER LINE MAX 3 LINES
G-2 3/16" LETTERS 11 CHARACTERS PER LINE MAX 2 LINE



E-1 1/8" LETTERS 17 CHARACTERS PER LINE MAX 4 LINES
E-2 3/16" LETTERS 11 CHARACTERS PER LINE MAX 4 LINES



H-1 1/8" LETTERS 17 CHARACTERS PER LINE MAX 4 LINES
H-2 3/16" LETTERS 11 CHARACTERS PER LINE MAX 4 LINES

STD: 3-0200-24X36D1

INTL REF:

BAR = 1" AT PLOT SCALE

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN

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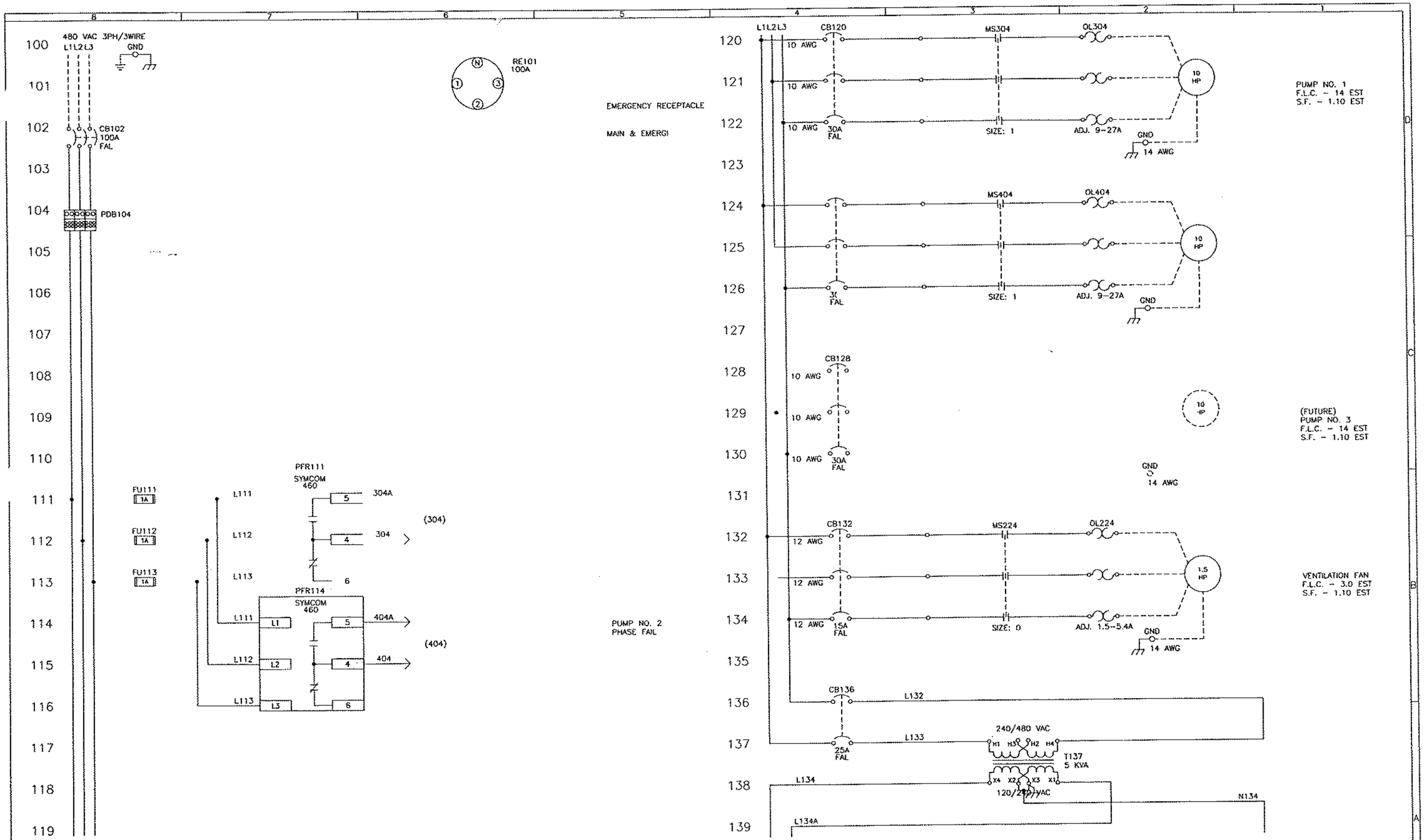
DESIGNER	DATE	TITLE NAMEPLATE DETAILS
CHECKER	DATE	
ENGINEER	DATE	CLIENT USFILTER STANDARD
MANAGER	DATE	USFILTER CONTROL SYSTEMS, VADNAIS HEIGHTS, MN, PH. 651-766-2700
FILE: STD-000-E06-001-00		
SCALE:		

PROJECT	CODE	DRAWING	SHEET	REV
STD	000	E06	01 OF 01	



NOTES:
1) FOR A COMPLETE LIST OF DRAWINGS AND PARTS REFER TO THE TABLE OF CONTENTS AND THE BILL OF MATERIALS.
2) GROUNDING LUG TO BE GROUNDED BY CUSTOMER PER NEC.
3) PULL ANALOG SIGNAL WIRES AND LOW VOLTAGE DC WIRES IN METALLIC CONDUIT SEPARATE FROM POWER/LOAD WIRING.
4) SEE ELECTRICAL DEVICE FOR ELECTRICAL RATINGS.
5) REMOVE JUMPER FOR NON-SERVICE ENTRANCE RATED ENCLOSURE. ALL WIRES ARE 16 AWG UNLESS SPECIFIED.

INTL REF: 7050

BAR = 1" AT PLOT SCALE

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

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		DATE
DESIGNER	JT	8/05
CHECKER	JMC	8/05
ENGINEER	JMC	8/05
MANAGER	EC	8/05

FILE: 504216-001-EDK-001-0
SCALE: NONE

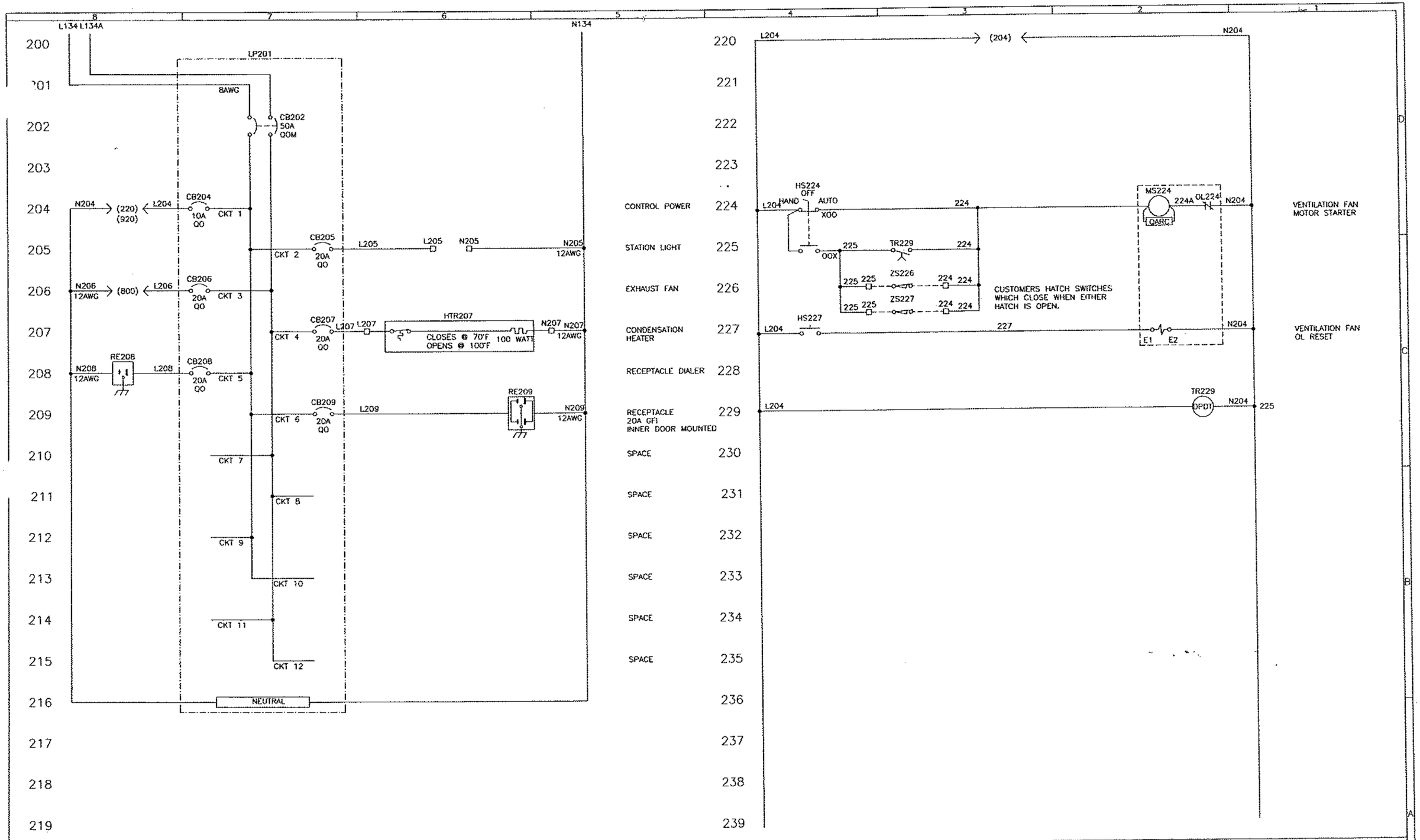
TITLE: POWER PACK INCOMING POWER
PUMP CONTROL PANEL
PANEL 001

CLIENT: SOUTH A STREET LS
ARVIN, CA

USFilter
USFILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-766-2700

PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E04	1 OF 11	0

STD: 3-0200-24X36D1



STD: 3-0200-24X3601

INTL REF: 7060

BAR = 1" AT PLOT SCALE

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

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		DATE
DESIGNER	JT	8/05
CHECKER	JMC	8/05
ENGINEER	JMC	8/05
MANAGER	EC	8/05

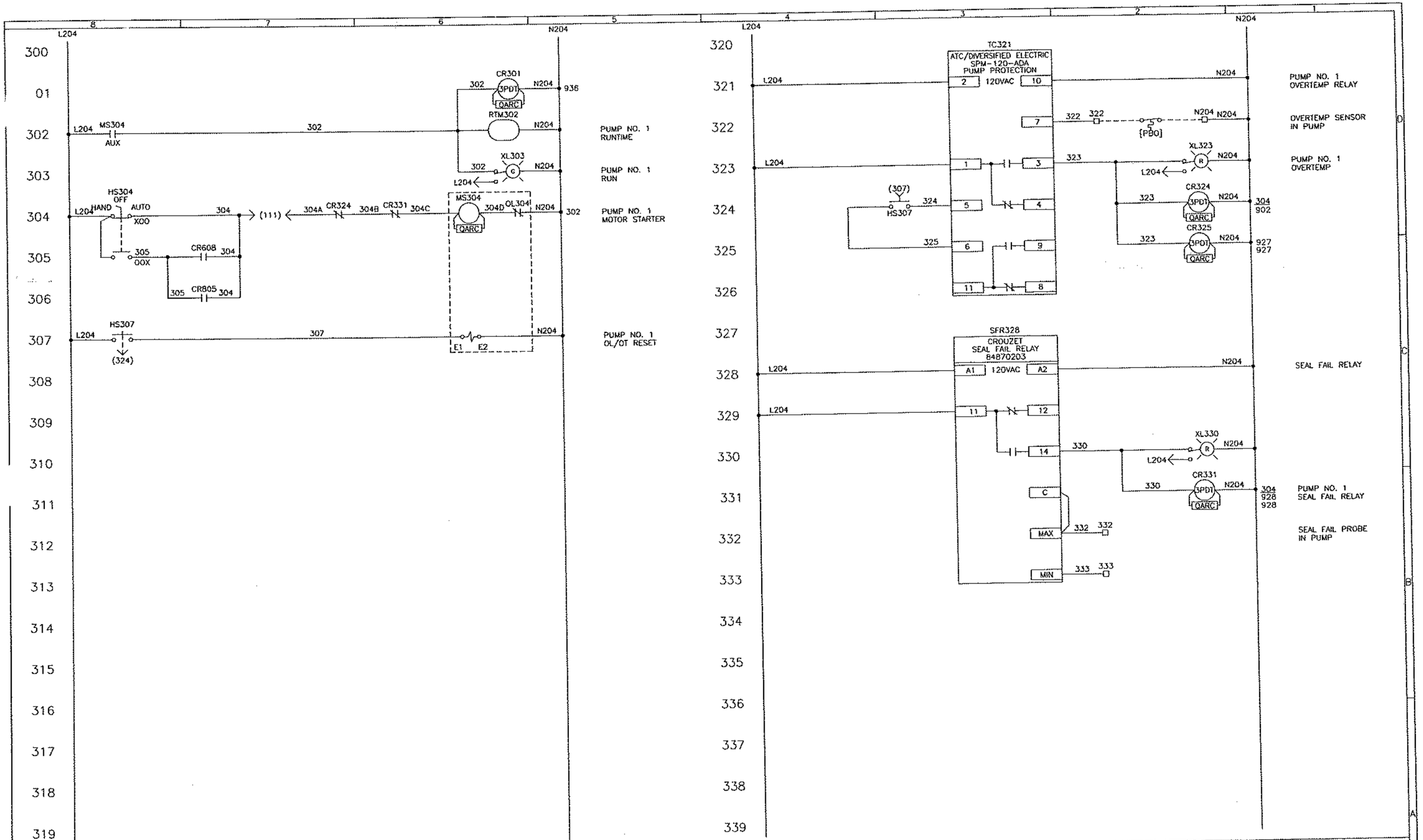
FILE: 504216-001-E04-002-0
SCALE: NONE

TITLE: POWER PACK LIGHTING PANEL
PUMP CONTROL PANEL
PANEL 001

CLIENT: SOUTH A STREET LS
ARVIN, CA

USFilter
USFILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-766-2700

PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E04	2 OF 11	0



REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
B	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

BAR = 1" AT PLOT SCALE

STD: 3-0200-24X36D1

INTL REF: 7060

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		DATE
DESIGNER	JT	8/05
CHECKER	JMC	8/05
ENGINEER	JMC	8/05
MANAGER		
EIC		8/05

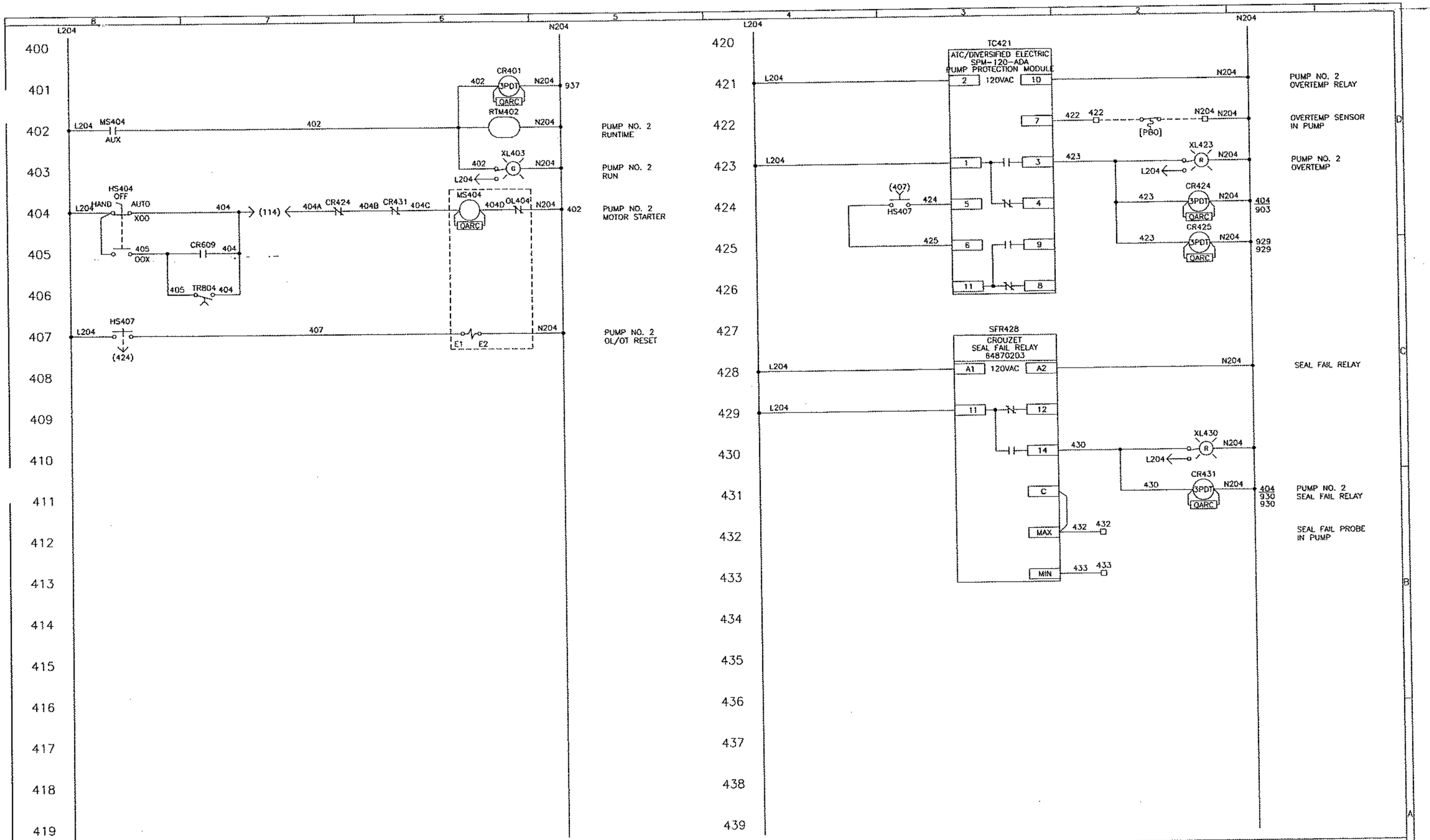
FILE: 504216-001-E04-003-0
SCALE: NONE

TITLE: PUMP 1 CONTROL
PUMP CONTROL PANEL
PANEL 001

CLIENT: SOUTH A STREET LS
ARVIN, CA

USFilter
USFILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-766-2700

PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E04	3 OF 11	0



REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

STD: 3-0200-24X36D1

INTL REF: 7060

BAR = 1" AT PLOT SCALE

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		DATE
DESIGNED:	JT	8/05
CHECKER	JMC	8/05
ENGINEER	JMC	8/05
MANAGER	EC	8/05

FILE: S04216-001-E04-004-0

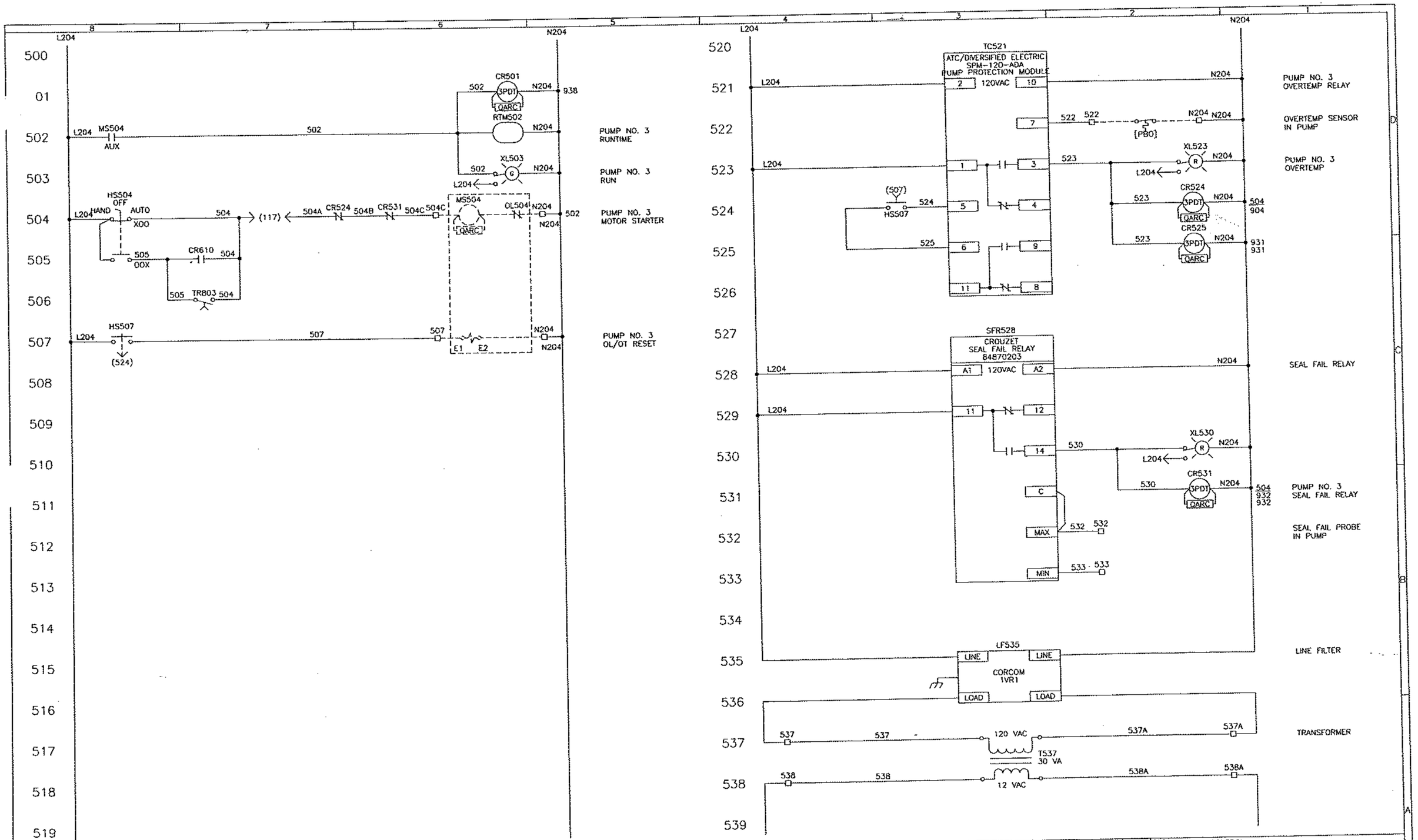
SCALE: NONE

TITLE: PUMP 2 CONTROL
PUMP CONTROL PANEL
PANEL 001

CLIENT: SOUTH A STREET LS
ARVIN, CA

USFilter
USFILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-765-2700

PROJECT	CODE	DRAWING	SHEET	REV
S04216	001	E04	4 OF 11	0



REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

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		DATE
DESIGNER	JT	8/05
CHECKER	JMC	8/05
ENGINEER	JMC	8/05
MANAGER	EC	8/05

FILE: 504216-001-E04-005-0
SCALE: NONE

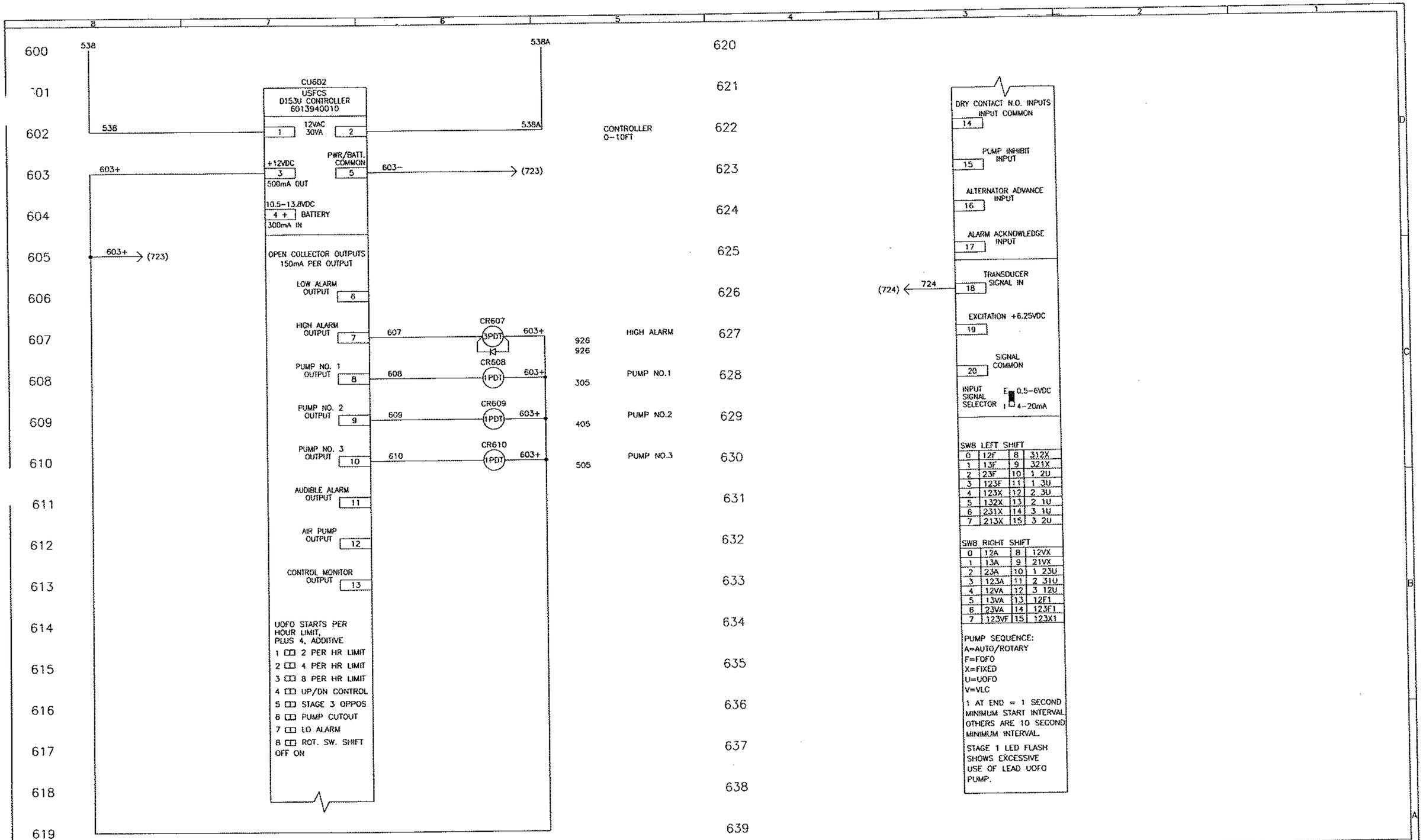
TITLE: PUMP 3 CONTROL
PUMP CONTROL PANEL
PANEL 001

CLIENT: SOUTH A STREET LS
ARVIN, CA

USFilter
USFILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-766-2700

PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E04	5 OF 11	0

STD: 3-0200-24X36D1
INTL REF: 7060
BAR = 1" AT PLOT SCALE



REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

BAR = 1" AT PLOT SCALE

STD: 3-0200-24X36D1

INTL REF: 7060

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		DATE
DESIGNER	JT	8/05
CHECKED	JMC	8/05
ENGINEER	JMC	8/05
MANAGER	EC	8/05

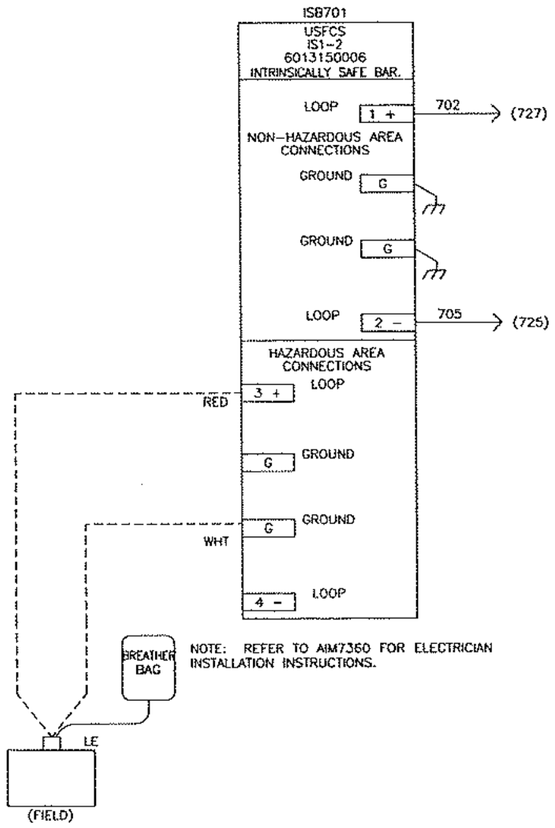
FILE: 504216-E01-006-B
SCALE: NONE

TITLE: PRIMARY CONTROL - D153U
PUMP CONTROL PANEL
PANEL 001

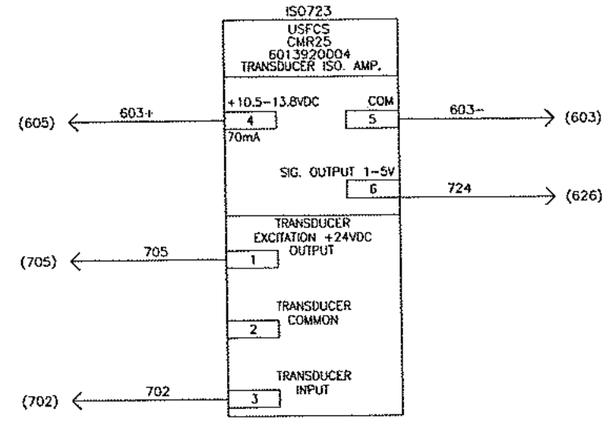
CLIENT: SOUTH A STREET LS
ARVIN, CA

USFilter
USFILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-766-2700

PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E04	6 OF 11	0



NOTE: REFER TO AIM7360 FOR ELECTRICIAN INSTALLATION INSTRUCTIONS.



NOTE:
IF SENSOR IS POWERED, CONNECT (+) TO TERM. 3 AND (-) TO TERM. 2.
IF SENSOR IS UNPOWERED, CONNECT (+) TO TERM. 1 AND (-) TO TERM. 3.

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

STD: 3-0200-24X3601 | INTL REF: 7060 | BAR = 1" AT PLOT SCALE

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		DATE
DESIGNER	JT	8/05
CHECKER	JMC	8/05
ENGINEER	JMC	8/05
MANAGER	EC	8/05

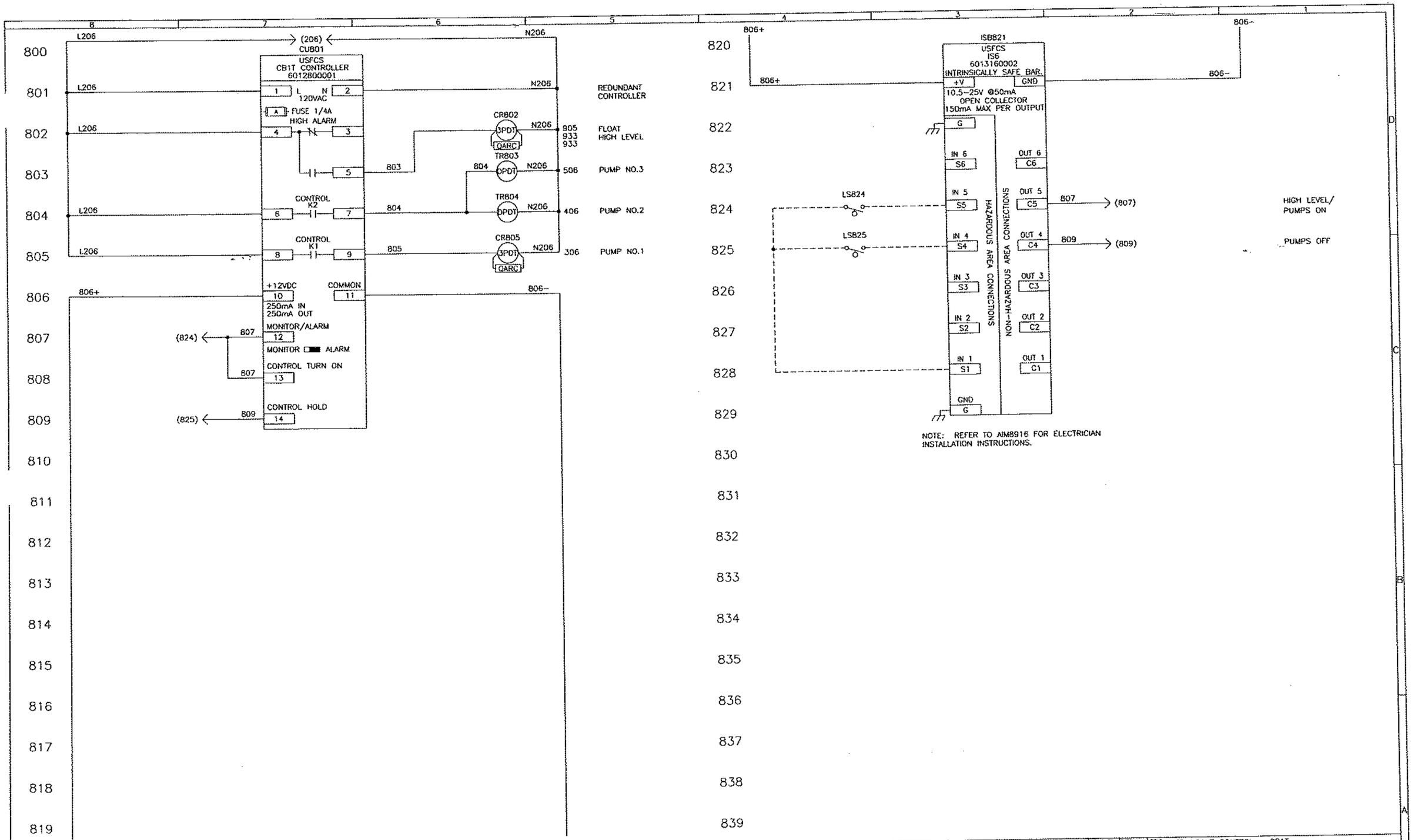
FILE: 504216-001-E04-007-0
SCALE: NONE

TITLE: INTRINSICALLY SAFE BARRIER (FOR D153U)
PUMP CONTROL PANEL
PANEL 001

CLIENT: SOUTH A STREET LS
ARVIN, CA

USFILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-766-2700

PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E04	7 OF 11	0



REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

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		DATE
DESIGNER	JT	8/05
CHECKER	JMC	8/05
ENGINEER	JMC	8/05
MANAGER	EC	8/05
FILE:	504216-D11-E04-006-0	
SCALE:	NONE	

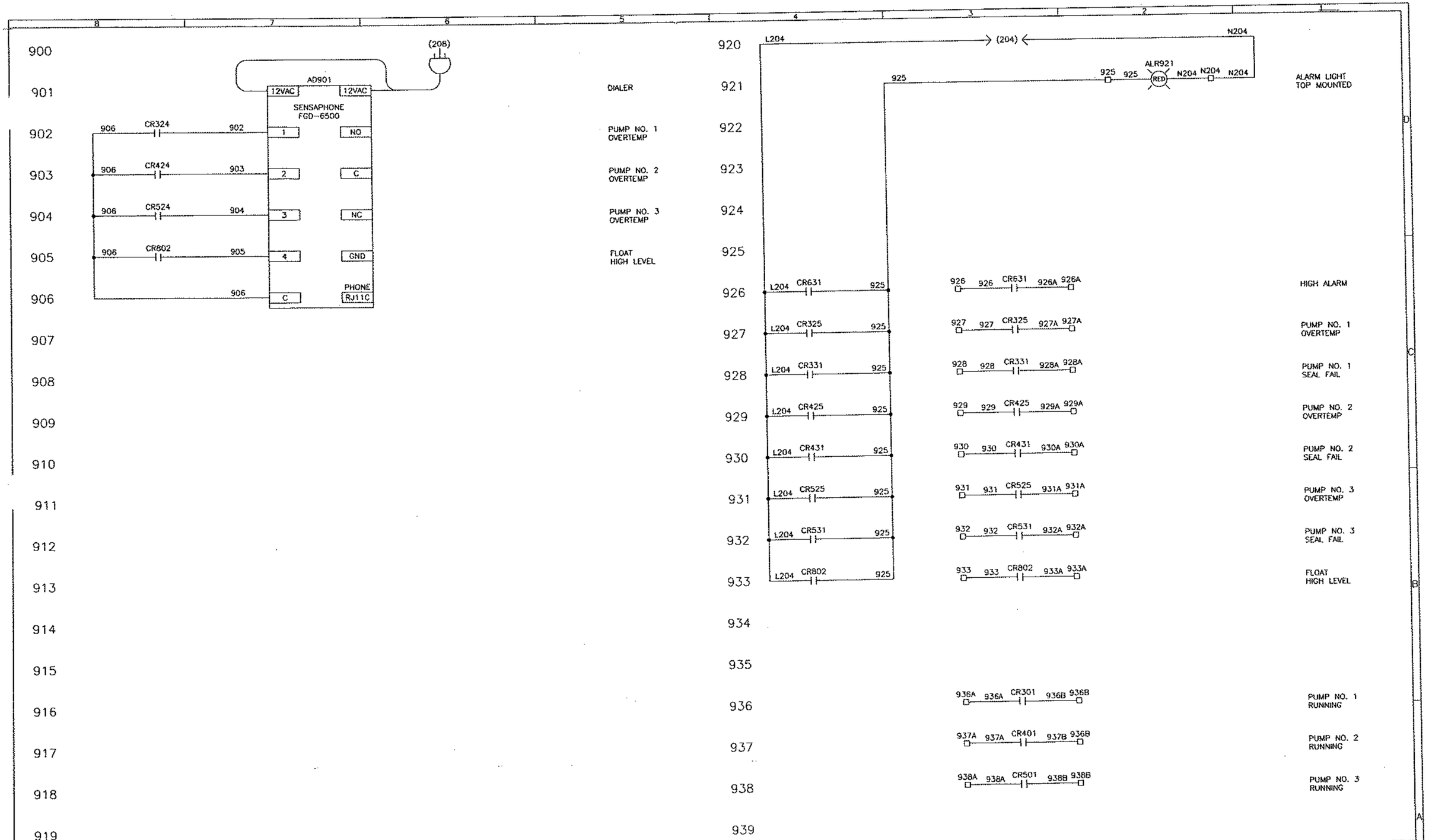
TITLE: REDUNDANT CONTROL - CB1T PUMP CONTROL PANEL PANEL 001

CLIENT: SOUTH A STREET LS ARVIN, CA

USFilter — USFILTER CONTROL SYSTEMS, VADNAIS HEIGHTS, MN, PH. 651-766-2700

PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E04	8 OF 11	0

STD: 3-0200-24X3601 | INTL REF: 7060 | BAR = 1" AT PLOT SCALE



REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

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		DATE
DESIGNER	JT	8/05
CHECKER	JMC	8/05
ENGINEER	JMC	8/05
MANAGER	EC	8/05

FILE: 504216-001-E04-009-0
SCALE: NONE

TITLE: DIALER
PUMP CONTROL PANEL
PANEL 001

CLIENT: SOUTH A STREET LS
ARVIN, CA

USFilter

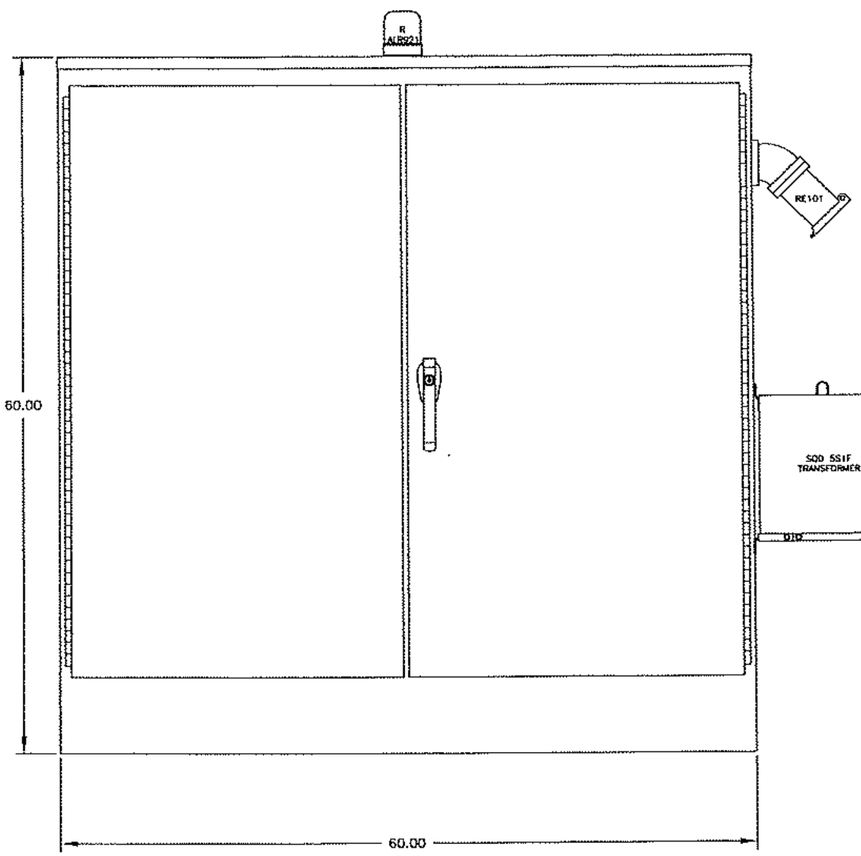
USFILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-766-2700

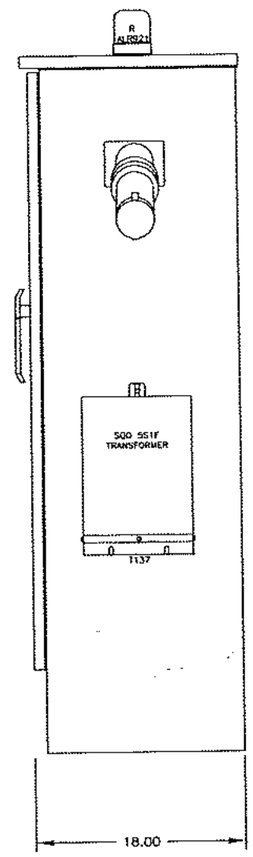
PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E04	9 OF 11	0

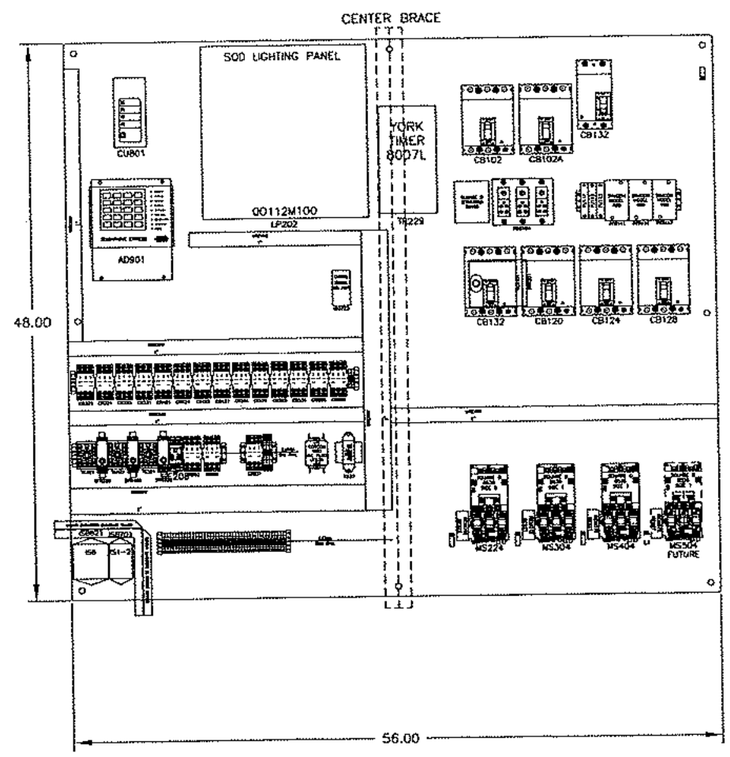
STD: 3-0200-24X3601
WTL REF: 7060
BAR = 1" AT PLOT SCALE

BACK PANEL SPECIFICATIONS	
MANUFACTURER	LEHMAN
SIZE	48.00 X 56.00
FINISH	WHITE

ENCLOSURE SPECIFICATIONS	
MANUFACTURER	LEHMAN
PART NUMBER	3R2F3GV606018XXXU
SIZE	60.00 X 60.00 X 18.00
CONSTRUCTION	16 OR 14 GAUGE GALVANIZED STEEL
TYPE	NEMA 3R
HINGED	LEFT
FINISH	ANSI 61 GRAY







REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

STD: 3-0200-24X36D1 | INTL REF: 7060 | BAR = 1" AT PLOT SCALE

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DESIGNER	JT	DATE 8/05
CHECKER	JMC	DATE 8/05
ENGINEER	JMC	DATE 8/05
MANAGER	EC	DATE 8/05
FILE:	SD4215-001-E02-010-0	
SCALE:	NONE	

TITLE: ENCLOSURE AND BACK PANEL LAYOUT
PUMP CONTROL PANEL
PANEL 001

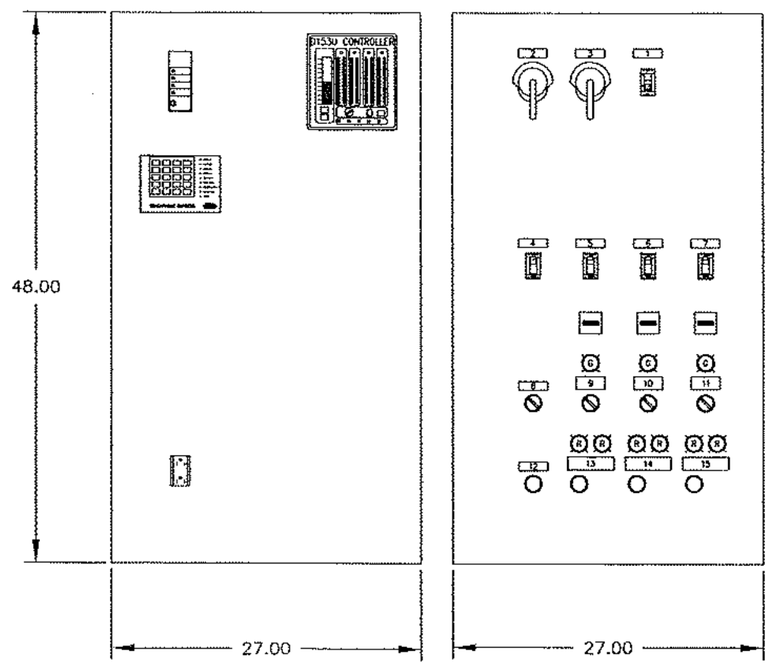
CLIENT: SOUTH A STREET LS
ARVIN, CA

US Filter
US FILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-766-2700

PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E02	10 OF 11	0

PUMP CONTROL PANEL	
SERIAL NO.: 504216	PROD. CODE: LC150
JOB NAME: ARVIN, CA	
VOLTS: 480 HERTZ: 60	PHASE: 3 WIRE: 3
MAX. F.L.C.:	LARG. MTR.: 10 H.P. F.L.C.
DRAWING NO.: 504216	PRESSURE:

INNERDOOR SPECIFICATIONS	
MANUFACTURER	USFCS
SIZE	48.00 X 27.00
CONSTRUCTION	ALUMINUM
HINGED	DOUBLE DOOR



1 TRANSFORMER CONTROL
A1 CB136

2 MAIN
A1 CB102

3 EMERGENCY
A1 CB102A

4 VENTILATION FAN
A1 CB132

5 PUMP NO. 1
A1 CB120

6 PUMP NO. 2
A1 CB124

7 PUMP NO. 3
A1 CB128

8 VENTILATION FAN
HAND OFF AUTO
A1 HS224

9 RUN
PUMP NO. 1
HAND OFF AUTO
B1 XL303, HS304

10 RUN
PUMP NO. 2
HAND OFF AUTO
B1 XL303, HS304

11 RUN
PUMP NO. 3
HAND OFF AUTO
B1 XL303, HS304

12 VENTILATION FAN
RESET
A1 XL303, HS304

13 OVERTEMP SEAL FAIL
PUMP NO. 1
RESET
C1 XL323, XL330, HS304

14 OVERTEMP SEAL FAIL
PUMP NO. 2
RESET
C1 XL423, XL430, HS404

15 OVERTEMP SEAL FAIL
PUMP NO. 3
RESET
C1 XL523, XL530, HS504

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN
0	ISSUED FOR CONSTRUCTION	09/05	JVE	JMC	JT	
A	AS SUBMITTED	8/05	JT	JMC	JT	

STD: 3-0200-24X3601 INTL REF: 7060 BAR = 1" AT PLOT SCALE

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	DATE
DESIGNER JT	8/05
CHECKER JMC	8/05
ENGINEER JMC	8/05
MANAGER EC	8/05

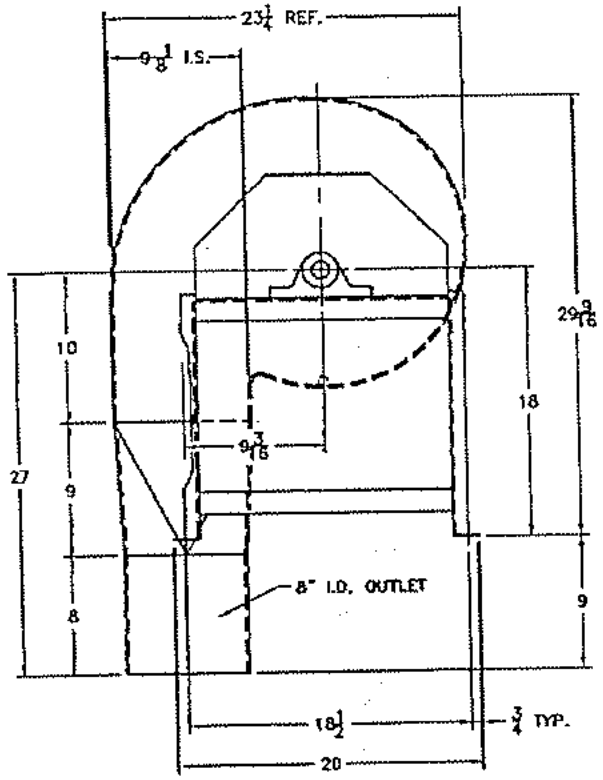
FILE: 504216-001-E03-011-0
SCALE: NONE

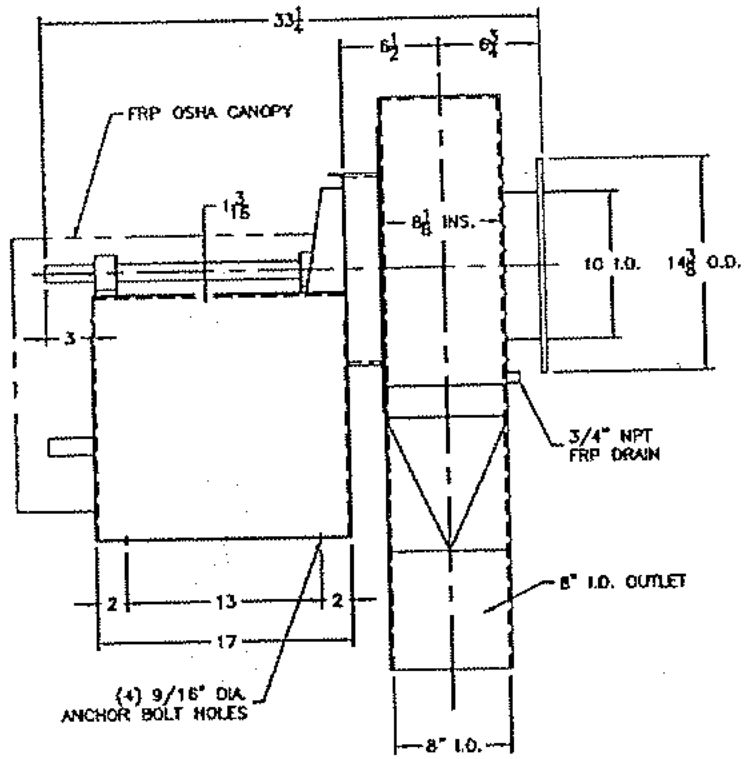
TITLE INNER DOOR LAYOUT AND NAMEPLATE SCHEDULE
PUMP CONTROL PANEL
PANEL 001

CLIENT SOUTH A STREET LS
ARVIN, CA

US FILTER CONTROL SYSTEMS
VADNAIS HEIGHTS, MN
PH. 651-766-2700

PROJECT	CODE	DRAWING	SHEET	REV
504216	001	E03	11 OF 11	0





NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. FAN INCLUDES INTEGRAL OUTLET TRANSITION TO 8" DIA.
3. INLET FLANGE DRILLING TO PS 15-69.
4. 4" LG. NEOPRENE SLEEVE TYPE FLEX. CONNECTORS CONSISTING OF;
   (1) 8" DIA. (1) 10" DIA. & (2) 12" DIA. SLEEVES W/ (2) S.S. DRAWBANDS EACH.

FAN SPECIFICATION			
ROTATION	COUNTER-CLOCKWISE		
ORIENTATION	DOWN-BLAST		
ARRANGEMENT	10		
HOUSING MATERIAL	HETRON 992/DION 9330		
IMPELLER MATERIAL	ATLAC 580		
CONSTRUCTION	CLASS 1		
COLOR GREEN	WEIGHT 225 LBS		
CFM 1900	RPM 1907/MAX. 2335		
TEMPERATURE:	Deg F DB	Deg F WB	
	ACTUAL	STD (70° F)	
AIR DENSITY	0.075 LB/CF	0.075 LB/CF	
STATIC PRESS	1.5" W.G.	W.G.	
BHP	1.48 BHP	BHP	
FAN ACCESSORIES			
INLET FLANGE X	OUTLET FLANGE –		
FLANGE DRILLING	X INLET	– OUTLET	
FLEX. CONNECTOR	– INLET	X OUTLET	
SHAFT MATERIAL	CARBON STEEL		
SHAFT SEAL	TEFLON		
GUARD:	– BELT	– SHAFT	
MTR. & DR. CANOPY	YES		
ACCESS DOOR	NONE		
INTEGRAL DISCHARGE	– TYPE 1	X TYPE 2	
FLANGED DISCHARGE	– TYPE 3	– TYPE 4	
TRANS. DRILLING	– INLET	– OUTLET	
TRANS. ATTACHMENT BOLTING	NONE		
MOTOR RAILS	NONE		
DRIVE	FIXED V-BELT		
VIBRATION MOUNTS	NONE		
MOTOR SPEC		STANDARDS	
HP BALDOR 1.50		X INLET FLG. F-1	
RPM 1800		– OUTLET FLG. F-2	
FRAME SIZE 145T		– TRANSITIONS T-1	
VOLTAGE 208-230/460			
PHASE 3		NON STD. ITEMS	
CYCLE 60			
ENCLOSURE TEFC			
WEIGHT 46 LB			
CUSTOMER INFORMATION			
P.O. NO.	TRACT 5938 101		
TAG:	–		
S.O. NO.	66395 / 7820		
NOTES:	–		
	–		

REV.	DATE	DESCRIPTION	DRWN	CHK'D

TITLE: CLMP-10 FAN

CUSTOMER: BAKERSFIELD, CA.

SCALE: 1 1/2"=1'-0

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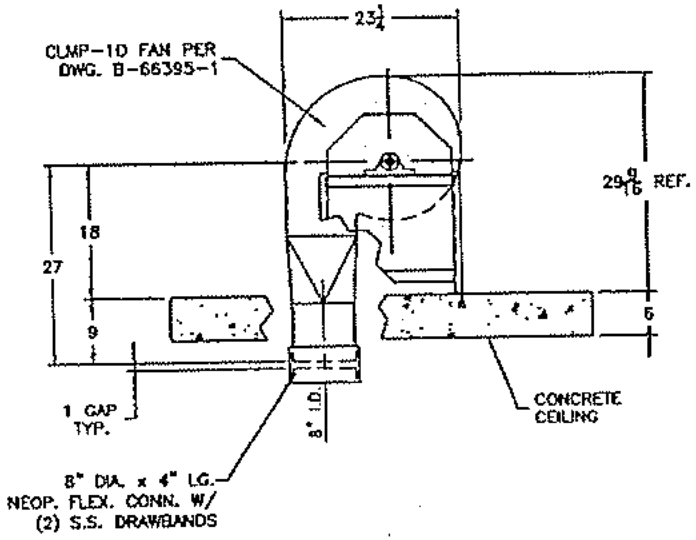
APPROVED: DATE: SHT.: 1 OF 4

CEILCOTE AIR POLLUTION CONTROL
ITEQ FILTRATION GROUP

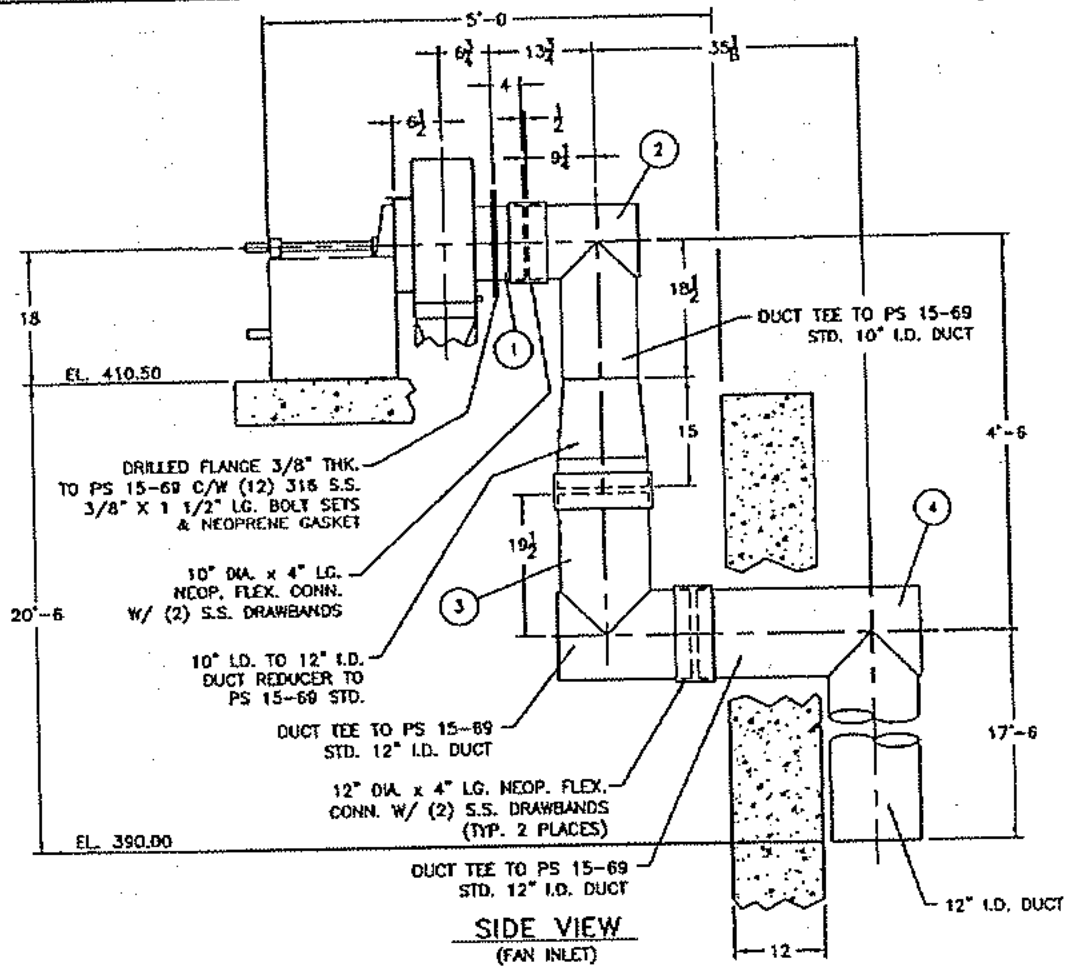
DRAWN: GB CHK'D.: DATE: DATE:

B-66395-1 REV. 0

CAD File: 66395-1.DWG [X] CUST. [X] SUB.



FRONT VIEW
(FAN DISCHARGE)



SIDE VIEW
(FAN INLET)

REV.	DATE	DESCRIPTION	DRWN	CHK'D

TITLE: CLMP-10 FAN GENERAL ARRANGEMENT

CUSTOMER: BAKERSFIELD, CA.

SCALE: 3/4"=1'-0

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APPROVED: DATE: SHT.: 2 OF 2

CEILCOTE AIR POLLUTION CONTROL
ITEQ FILTRATION GROUP

DRAWN: GB CHK'D.: DATE: DATE:

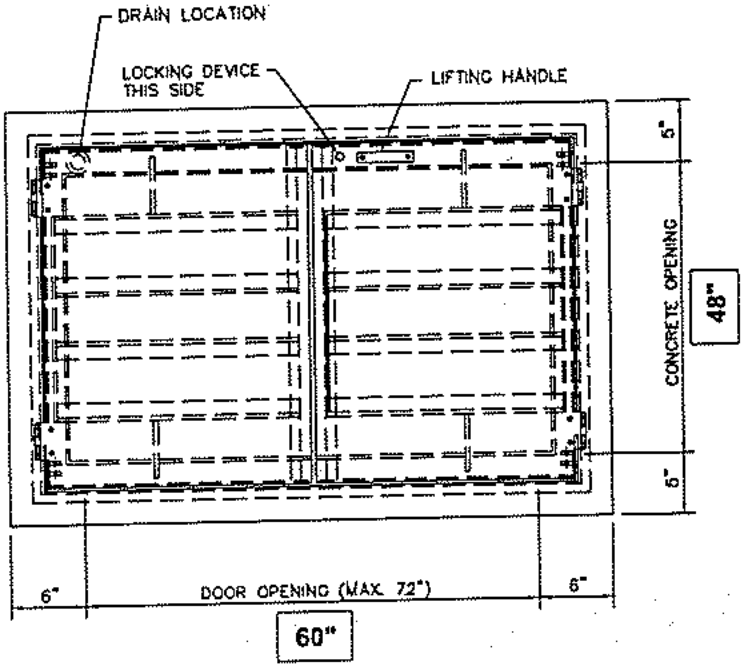
B-66395-2 REV. 0

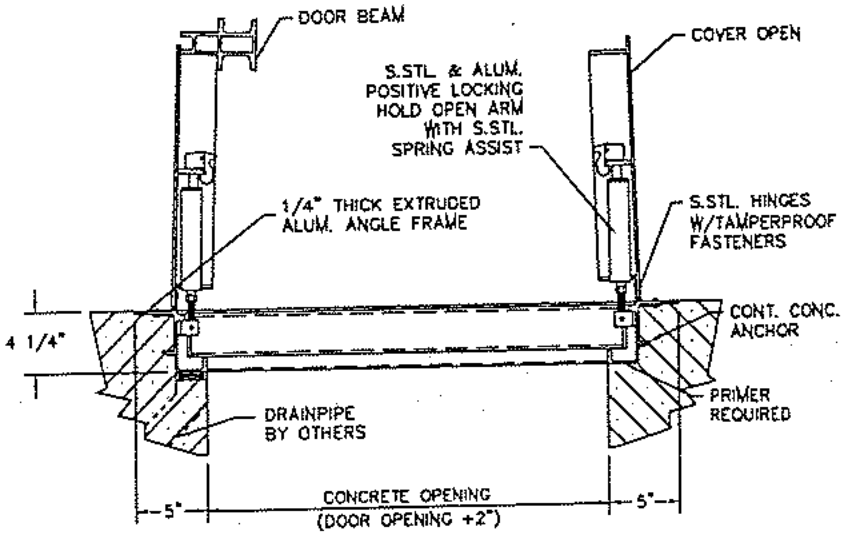
CAD File: 66395-2.DWG [X] CUST. [X] SUB.

HALLIDAY PRODUCTS, INC.
ORLANDO, FL
http://www.hallidayproducts.com

HALLIDAY PRODUCTS

MODEL NO. H2C060048KHB---
UNIT WT. 345 LB.
QUANTITY: ONE
ORDER NO. W73363
LOCATION/TAG: NONE





SECTION

STANDARD FEATURES:

1/4 ALUMINUM TREAD PLATE COVER
1/4 THICK ALUM. ANGLE FRAME EXTRUSION
T-316 STAINLESS STEEL HARDWARE
S.STL. & ALUM. HOLD OPEN ARM
SPRING ASSIST
RECESSED LIFT HANDLE (S)
LIFETIME GUARANTEE
H-20 LOAD RATING

4	NO. HINGES
1	NO. HANDLES
X	ASTRAGAL: HPO-14 BEAM WELDED TO R.H. DOOR.

OPTIONS/FEATURES:

		PADLOCK BAR
	X	S.STL. SLAM LOCK W/ KEY
*		KEYED CYLINDER LOCK
*	X	RECESSED LOCK BOX
	X	BITUMINOUS COATING
		CLEAR ANODIZED FINISH
		LACQUER FINISH
		GASKET/CUSHION
*		3" INSULATION W/ CAPTIVE PAN
*		NUTRAIL - SPECIFY LENGTH & LOCATION
*		BOLT DOWN COVER
*		SAFETY CABLE COVER TO COVER
		SLAB SKIRT HEIGHT (INCLUDING FRAME)
	X	PVC PROTECTIVE COVER

* [ ] MISCELLANEOUS

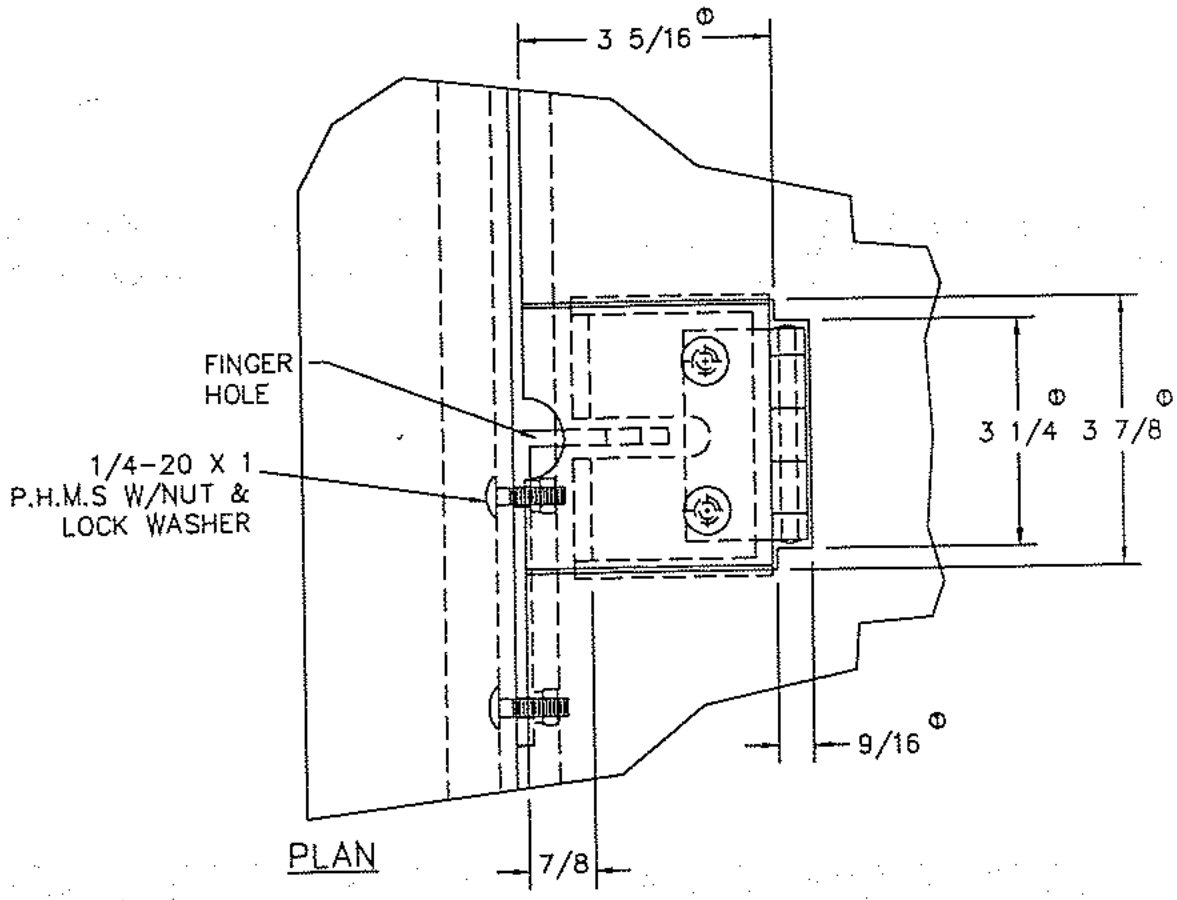
* SEE ACCOMPANYING DETAIL DRAWING

NOTES:

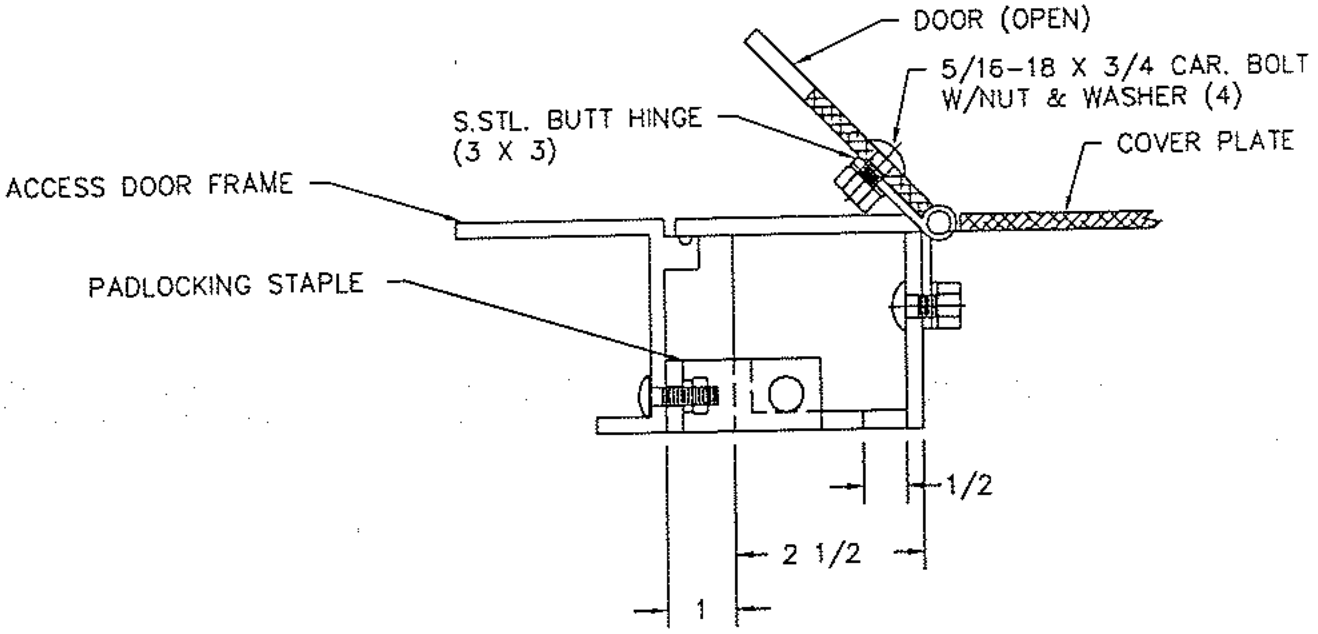
1) SUITABLE FOR USE IN OFF STREET LOCATION WHERE NOT SUBJECTED TO HIGH DENSITY TRAFFIC.

2) PROVIDE A FULL BED OF CLASS "A" CONCRETE UNDER FRAME AND SUPPORT ANGLES.

8/02/05(L)



PLAN



SECTION

NOTE:
1) CUT OUT IN DOOR FOR BOX

HALLIDAY PRODUCTS ORLANDO FL.		
SCALE 3/8	STD. H.P. RECESSED PADLOCK BOX FOR SERIES S ACCESS DOORS	STANDARD
DATE 3/31/94		APPROVED BY
REVISED 8/02/05	MATERIAL ALUM. (S.STL. HINGE & FASTENERS)	DWG NO W73363

Appendix C: Project Hazard Analysis

Harris & Associates

PROJECT HAZARD ANALYSIS (PHA) FORM

Project Name: Arvin Sewer Master Plan	**Project No.:** 1800032001	**Client:** Veolia
Site/Location: Arvin, California	**Site conditions or weather:**	
Contractor: n/a	**Start Date:** July 19, 2019	**Finish date:**

Check applicable anticipated or potential hazards:

☐ Demolition
☒ Inspections from heights involving ladders, scaffolds or man-lifts
☐ Excavation
☐ Activities in traffic control areas with TCP in place
☒ Active traffic zone without TCP
☒ Active pedestrian and bicycle area
☐ Concrete cutting/coring
☐ Mobile heavy equipment activity (excavators, dump trucks and grading)
☐ Pile driving
☐ Welding, cutting, grinding
☐ Work involving energized electrical equipment
☐ Trench shoring/Soldier beams
☐ Post tension operations
☒ Heat stress/ Cold weather
☐ False work/formwork inspection
☐ Hydroblasting/sandblasting
☐ Radiography/X-ray testing
☐ Overhead electrical
☒ Environmental hazards/plants/animals
☒ Personal security
☒ Other: Heavy Lifting
☒ Other: Pinch Points

Critical Procedures: Where work involves any of the following hazards, applicable controls (AHA) must be implemented and the **Corporate Safety Officer shall be notified prior to start of work**.

☒ Confined Space Entry (includes tank cleaning)
☐ Electrical Mechanical Lockout (live, isolation)
☐ Heavy Equipment Lifting (cranes, boom trucks, excavators)
☐ Sub-surface drilling (pre-drill/borehole/excavation protocol)
☐ Entry into excavations > (10 ft.) deep
☐ Hot Work (in a potentially explosive atmosphere)
☐ Work in or adjacent to a roadway with speeds of 45MPH+
☐ Activities within Railroad ROW
☐ Night time surveys

Ensure that all hazards identified are addressed in AHA below

Prepared by: Tony Herda (PM)	Date Prepared: 7/16/2019	Reviewed by:	Date Reviewed:

Identified hazard (from list above)	Potential impact	Safety Controls to Reduce or Eliminate Hazard (Describe the precautions that will be taken)
1. Inspections from heights (i.e. surface to bottom of manhole)	Falling	Cover open manhole with a metal ladder

2. Active traffic zone without Traffic Control Plan (TCP)	Struck by vehicle, vehicle damage	Deploy Harris vehicle with flashing hazard light. Set up orange cones around open manhole. Use hand-held stop sign as needed.
3. Active pedestrian and bicycle area	Injury to third parties	Do not allow access to the inspection area. Do not leave an open manhole unattended.
4. Heat stress	Heat stroke, dehydration	All team member must review *Heat Illness Prevention Program*. Keep a water supply in the vehicle. Stay hydrated. Work in teams. Wear an appropriate hat. Take breaks in the shade, as needed. Schedule work to avoid hottest part of the day.
5. Environmental hazards	Fumes, cockroaches	Use magnetic manhole cover lifter provided by Veolia. Allow manhole to vent before inspecting. Do not enter manhole.
6. Personal security	Altercations, theft	Stay vigilant. Work during the day. Confer with local operations staff regarding dangerous neighborhoods. Secure personal property. Direct question to Veolia operations staff.
7. Heavy Lifting	Back strain	Use magnetic manhole cover lifter provided by Veolia. Rock manhole cover back and forth to replace rather than dragging.
8. Pinch Points	Sever fingers or toes	Use magnetic manhole cover lifter provided by Veolia. Do not handle manhole cover with hands, only with tools. ASTM 71 Safety Boots are recommended.

Where necessary, insert additional pages or photographs to complete PHA

Roadway speeds of 45MPH or less.

Westbound CA 223 (Bear Mountain Blvd.) at Morton Place

Eastbound CA 223 (Bear Mountain Blvd.) entering Arvin at Comanche Drive

Appendix D: Campus Drive Alley Pipeline Project Reference Materials

Campus Drive Alley Pipeline Project Cost Estimate

Reach No.	Item	Action	Cost
Number	Reach		
1	07-1007_07-1006_10/26/2009_U	Replacement	$ 120,000.00
2	07-1006_07-1005_10/26/2009_U	Replacement	$ 117,000.00
3	07-1005_07-1004_10/26/2009_D	Replacement	$ 96,000.00
4	07-1004_07-1003_10/27/2009_D	Replacement	$ 106,000.00
5	07-1003_07-1002_10/26/2009_D	Replacement	$ 52,000.00
6	07-1002_07-1001_10/26/2009_D	Replacement	$ 46,000.00
	Manholes		
	07_1007	Replace	$ 8,000.00
	07-1006	Replace	$ 8,000.00
	07_1005	Replace	$ 8,000.00
	07_1004	Replace	$ 8,000.00
	07_1003	Replace	$ 8,000.00
	07_1002	Replace	$ 8,000.00
	07_1001	Replace	$ 8,000.00
	Total Construction Cost		$ 593,000.00
	Engineering & Construction Management	25%	$ 148,000.00
	Contingencies	20%	$ 119,000.00
	Administrative	5%	$ 30,000.00
	CIP Estimate		**$ 890,000.00**

Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/26/2009	Weather:	Dry		
Pipe Length (ft):	0	Owner:	City of Arvin	Pre Clean:	Jetting
P.O.#:	W/O # 12014	Surveyor:	JJC	PSR:	07-1007 to 07-1006
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

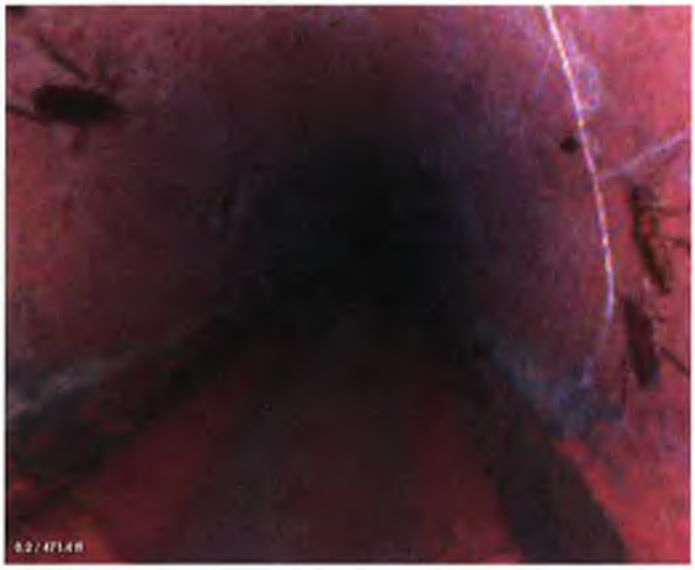
Street:	Campus Alley	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Alley	Tape/Media #:	NS11-1186
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Vitrified Clay Pipe
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Upstream

US MH: 07-1007 DS MH: 07-1006 Total Length Surveyed (ft): 471

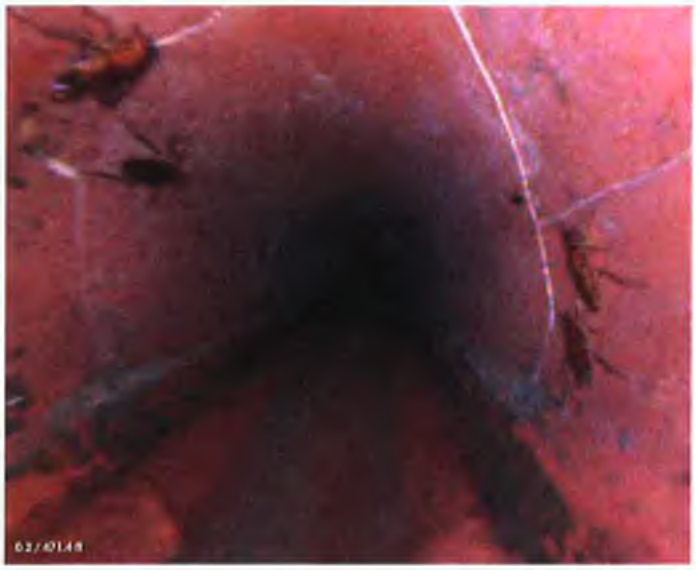
Position	Code	Observation	Video (sec)	Grade
0.24	AMH	Manhole	5	NA
0.24	MWL	Water Level 5%	13	NA
0.24	CM	Crack Multiple MH 07-1007 to 3	22	S 3
0.24	VC	Vermin Cockroach	30	M 1
3.17	MWL	Water Level 20%	45	NA
36.26	MWL	Water Level 40% J31 - 50	119	NA
49.66	LL	Alignment Left	154	M 2
78.75	MWL	Water Level 20%	220	NA
100.17	MGP	General Photo	271	NA
105.9	MWL	Water Level J 103 - 125	291 (40%)	NA
105.9	SSS	Surface Spalling	299	S 2
139.29	MWL	Water Level 25%	376	NA
143.22	LR	Alignment Right	392	M 2
146.19	LL	Alignment Left	406	M 2
180.24	MWL	Water Level J 178 to	482	NA
188.37	MCU	Camera Underwater	507	M 4
471.4	MSA	Abandoned Survey	1081	NA

- more than 50% of the pipe was >50% ~~dea~~ cross

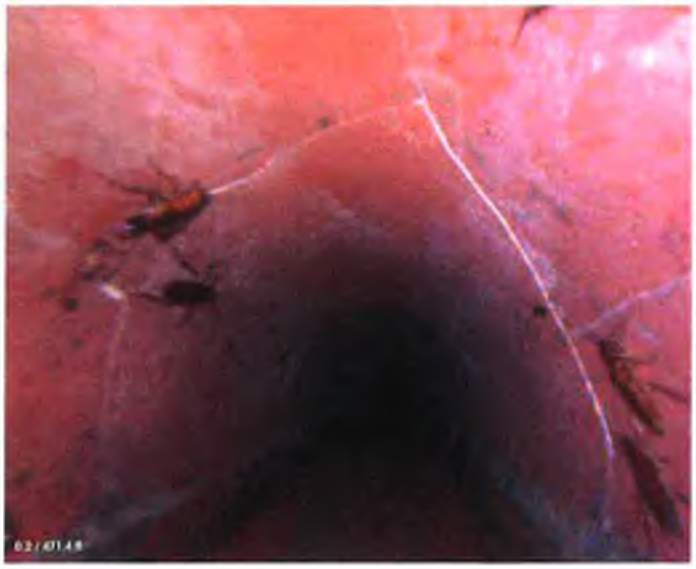
Open Trench Pipe Replacement (500 ft)



PACP Code:	AMH
Description:	Manhole
Distance (ft):	0.24
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey

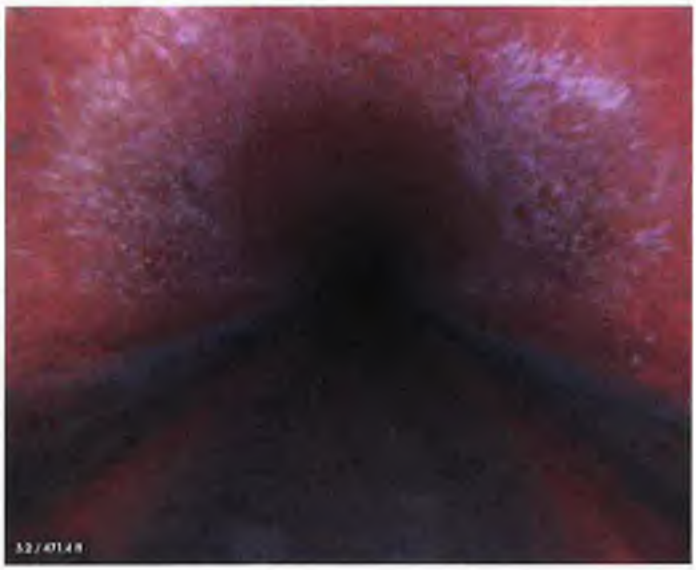


PACP Code:	MWL
Description:	Water Level
Distance (ft):	0.24
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	0.24
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	0.24
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MWL
Description:	Water Level
Distance (ft):	3.17
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

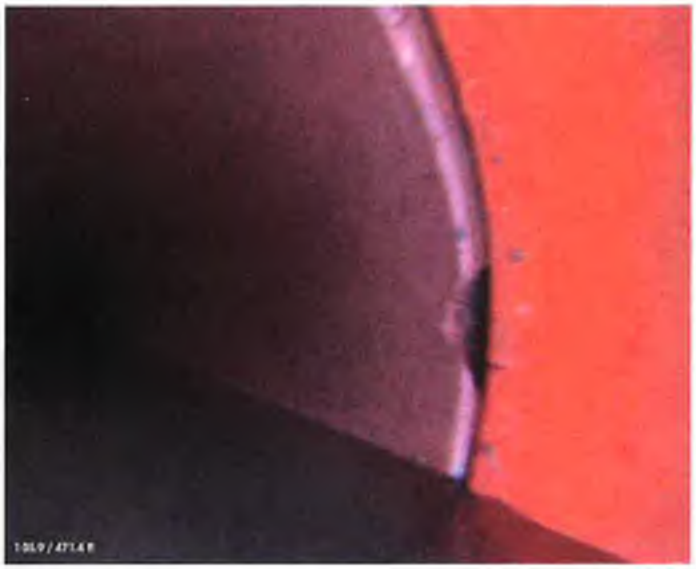
PACP Code:	MWL
Description:	Water Level
Distance (ft):	36.26
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	LL
Description:	Alignment Left
Distance (ft):	49.66
Structural Grade:	NA
O&M Grade:	2
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	78.75
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	100.17
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

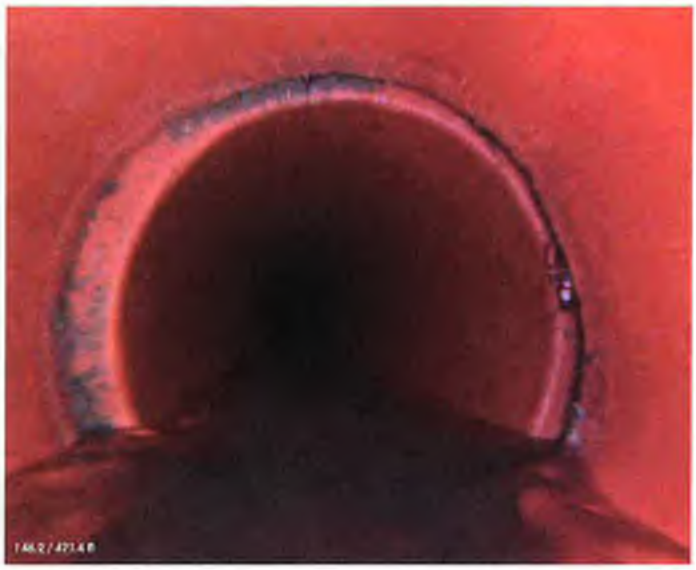
PACP Code:	MWL
Description:	Water Level
Distance (ft):	105.9
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	105.9
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	3
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

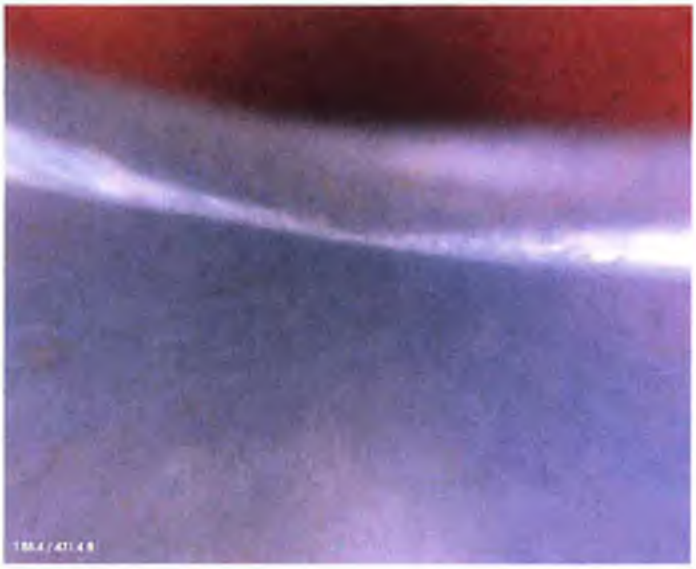
PACP Code:	MWL
Description:	Water Level
Distance (ft):	139.29
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	LR
Description:	Alignment Right
Distance (ft):	143.22
Structural Grade:	NA
O&M Grade:	2
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	LL
Description:	Alignment Left
Distance (ft):	146.19
Structural Grade:	NA
O&M Grade:	2
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	180.24
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MCU
Description:	Camera Underwater
Distance (ft):	188.37
Structural Grade:	NA
O&M Grade:	4
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MSA
Description:	Abandoned Survey
Distance (ft):	471.4
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Poor mobility

Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/26/2009	Weather:	Dry		
Pipe Length (ft):	0	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12014	Surveyor:	JJC	PSR:	07-1006 to 07-1005
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	Campus Alley	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Alley	Tape/Media #:	NS6-815
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Vitrified Clay Pipe
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Upstream

US MH: 07-1006 DS MH: 07-1005 Total Length Surveyed (ft): 424

07-1005

Camera Direction

Position	Code	Observation	Video (sec)	Grade
0	AMH	Manhole	5	NA
0	MWL	Water Level 25%	13	NA
0.08	VC	Vermin Cockroach	21	M 1
22.17	MWL	Water Level 50%	75	NA
30.24	TF	Tap Factory	99	NA
31.02	CM	Crack Multiple J 31 – 34	110	S 3
32.65	TF	Tap Factory	122	NA
43.01	SSS	Surface Spalling J 41 - 44	152	S 2
50.48	MGP	General Photo	177	NA
81.77	TF	Tap Factory	247	NA
84.31	TF	Tap Factory	262	NA
100.45	MGP	General Photo	304	NA
130.21	TF	Tap Factory	371	NA
131.09	VC	Vermin Cockroach	383	M 1
132.59	TF	Tap Factory	395	NA
145.01	MCU	Camera Underwater	429	M 4
162.37	MCU	Camera Underwater	472	M 4
424.05	MSA	Abandoned Survey	1004	NA

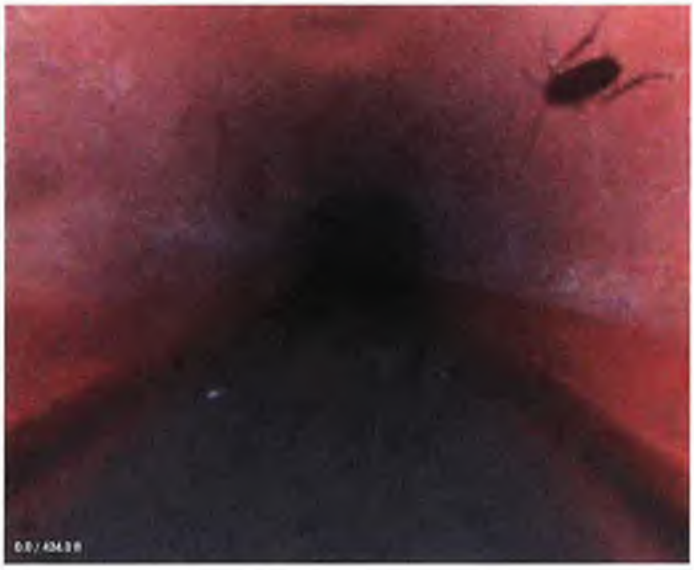
07-1006

- camera stays above 40% for most of the pipe (waterlevel)
- abandoned survey due to visibility

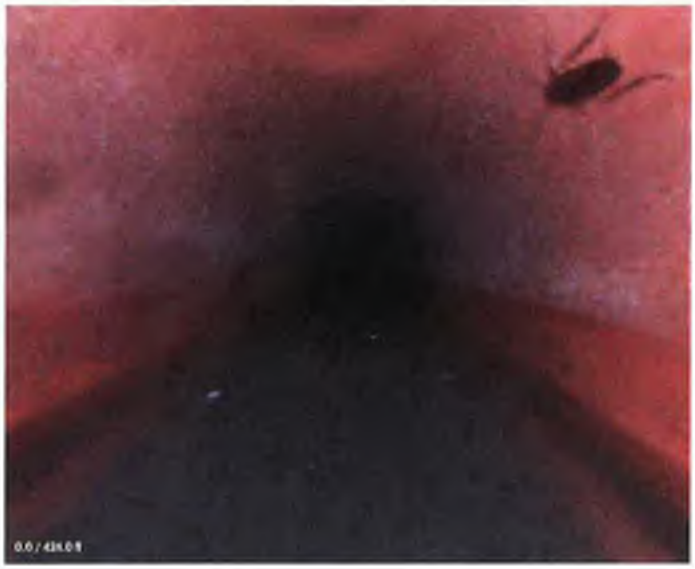
Recommendation

Open Trench Pipe Replacement (488)

due to crossectional flow > 30%

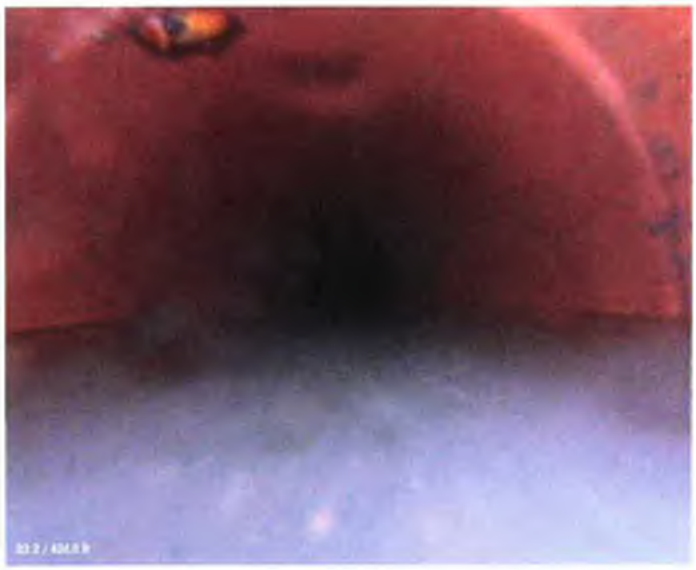


PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey

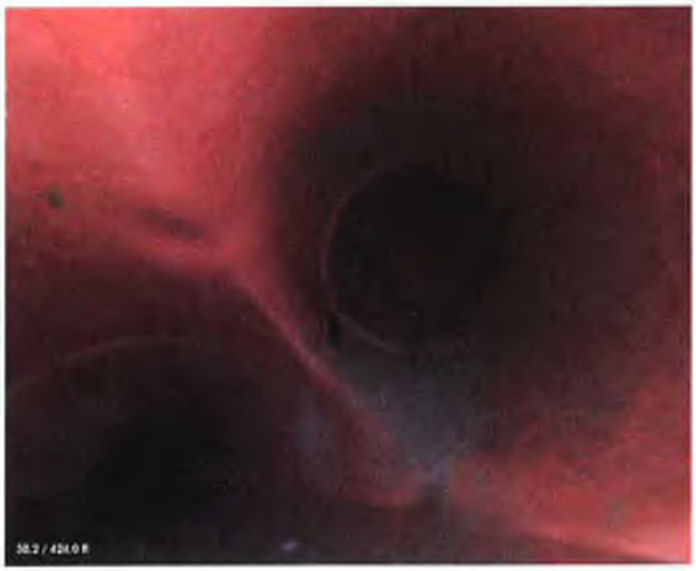


PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

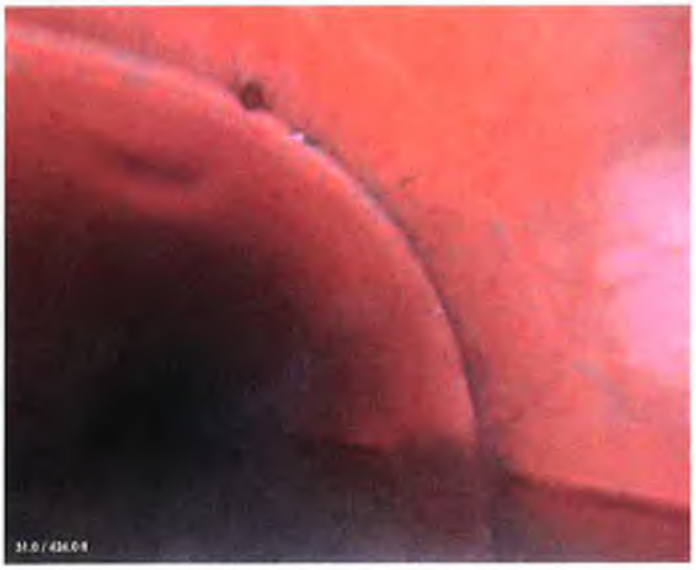
PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	0.08
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MWL
Description:	Water Level
Distance (ft):	22.17
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

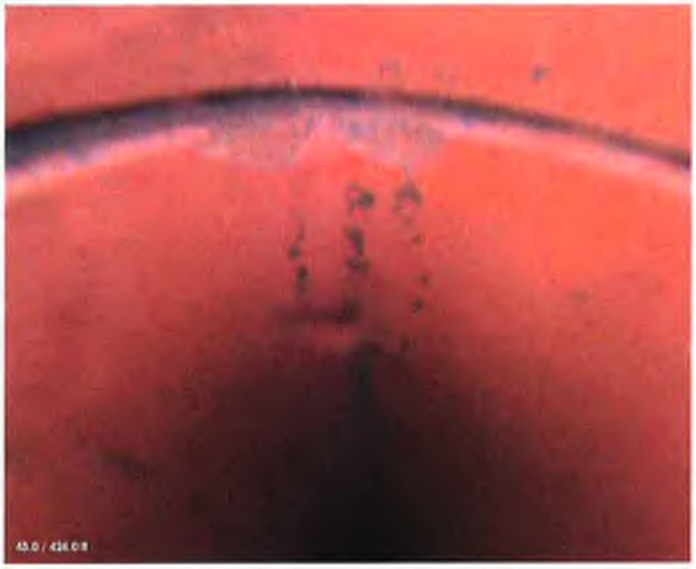


PACP Code:	TF
Description:	Tap Factory
Distance (ft):	30.24
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

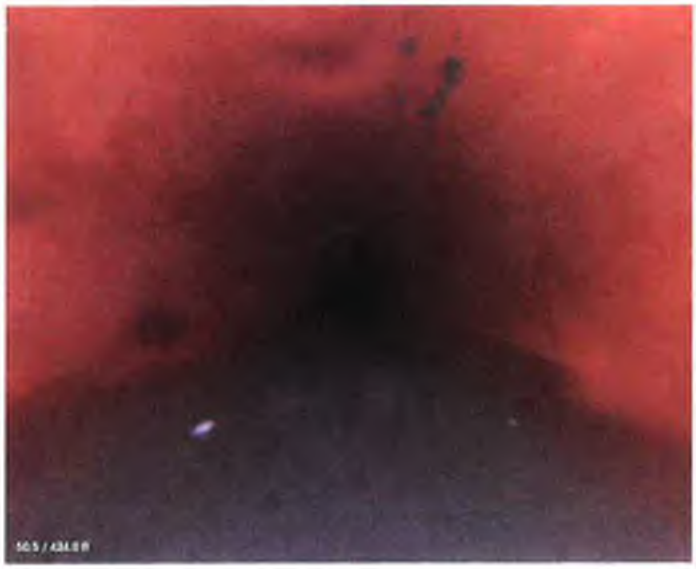


PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	31.02
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	2
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

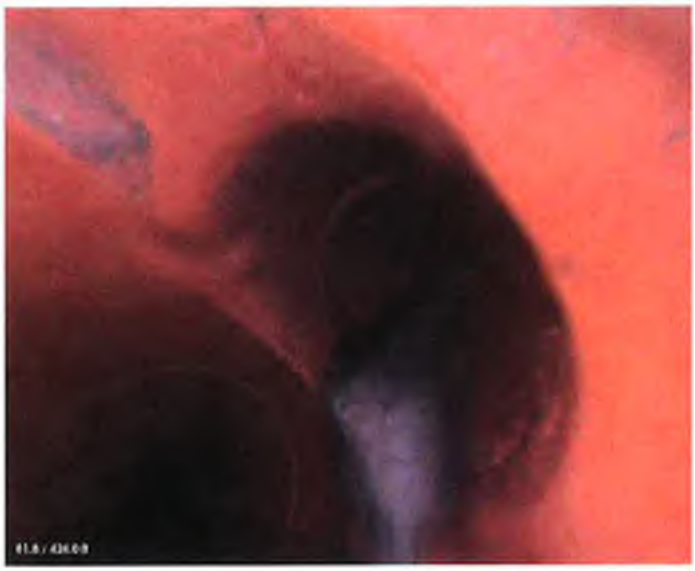
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	32.65
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



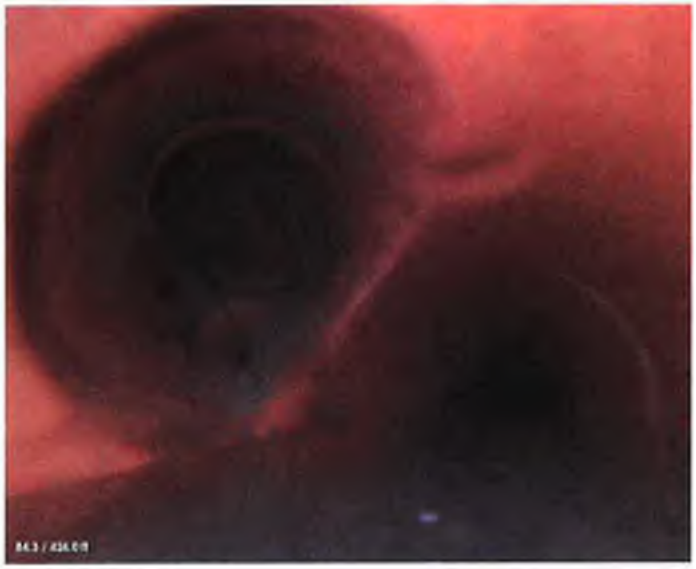
PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	43.01
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	12
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	MGP
Description:	General Photo
Distance (ft):	50.48
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	81.77
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Deposits



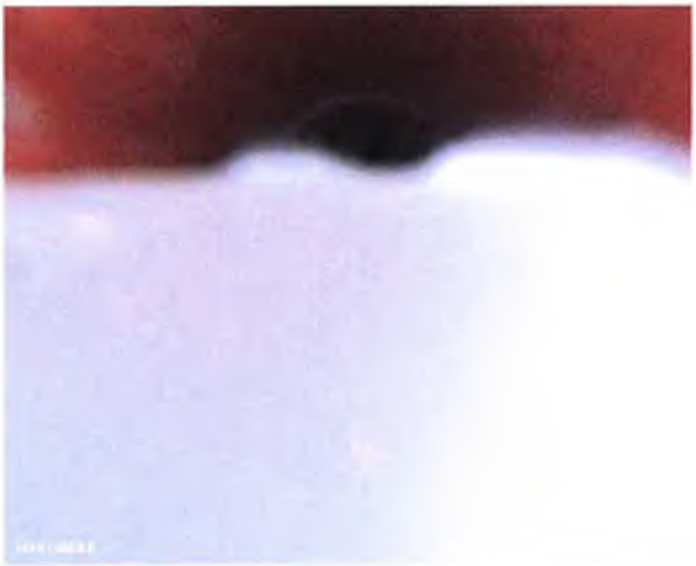
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	84.31
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	100.45
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	130.21
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	131.09
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	132.59
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MCU
Description:	Camera Underwater
Distance (ft):	145.01
Structural Grade:	NA
O&M Grade:	4
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MCU
Description:	Camera Underwater
Distance (ft):	162.37
Structural Grade:	NA
O&M Grade:	4
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MSA
Description:	Abandoned Survey
Distance (ft):	424.05
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Poor mobility

Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/26/2009	Weather:	Dry		
Pipe Length (ft):	498	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12014	Surveyor:	JJC	PSR:	07-1005 to 07-1004
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	Campus Alley	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Alley	Tape/Media #:	NS23-701
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Vitrified Clay Pipe
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Downstream

US MH: 07-1005 DS MH: 07-1004 Total Length Surveyed (ft): 498

Recommendations

① Spot Repair J46 - 56
J 94.5 - 97.5
J 110 - 172
J 228 - 246.5

} 93 ft

② CIPP Entire Lining } 498 ft

07-1005

Camera Direction

Position	Code	Observation	Video (sec)	Grade
0	AMH	Manhole	5	NA
0	MWL	Water Level 5%	13	NA
0	VC	Vermin Cockroach	21	M 1
8.09	TF	Tap Factory	46	NA
10.02	CM	Crack Multiple J10 - 13	59	S 3
10.47	TF	Tap Factory	69	NA
11.64	MWL	Water Level 40% (J10 - 15)	81	NA
27.69	CM	Crack Multiple	121	S 3
50.25	TB	Tap Break-in	175	NA
59.21	TF	Tap Factory	202	NA
61.66	TF	Tap Factory	216	NA
94.39	JOM	Joint Offset Medium J94.5 - 97.5	290	S 1
100.14	MGP	General Photo	311	NA
110.54	TF	Tap Factory	340	NA
113.02	TF	Tap Factory	354	NA
115	SSS	Surface Spalling J115 - 118	367	S 2
128.36	TB	Tap Break-in	403	NA
150.23	MGP	General Photo 30% WL	456	NA
162.08	TF	Tap Factory	488	NA
164.5	TF	Tap Factory	503	NA
194.55	FC	Fracture Circumferential J194.5 - 197.5	572	S 2
197.7	FM	Fracture Multiple J 197.5 to 200.5	588	S 4
200.73	FS	Fracture Spiral J 200.5 to 203.5	604	S 3
202.03	TB	Tap Break-in	617	NA
213.71	TF	Tap Factory	649	NA
216.23	TF	Tap Factory	664	NA
246.43	CM	Crack Multiple J246.5 - 249.5	734	S 3
250.67	MGP	General Photo	752	NA
255.92	MWL	Water Level 5%	771	NA
261.99	CC	Crack Circumferential J262 - 265	791	S 1
265.61	TF	Tap Factory	808	NA
268.09	TF	Tap Factory	823	NA
273.86	TB	Tap Break-in	843	NA
279.43	CC	Crack Circumferential J279.5 282.5	863	S 1
301.74	MGP	General Photo	917	NA
314.29	TF	Tap Factory	951	NA
315.15	MWL	Water Level 30%	963	NA
316.78	TF	Tap Factory	974	NA
321.83	VC	Vermin Cockroach	994	M 1
335.18	MWL	Water Level 10%	1030	NA

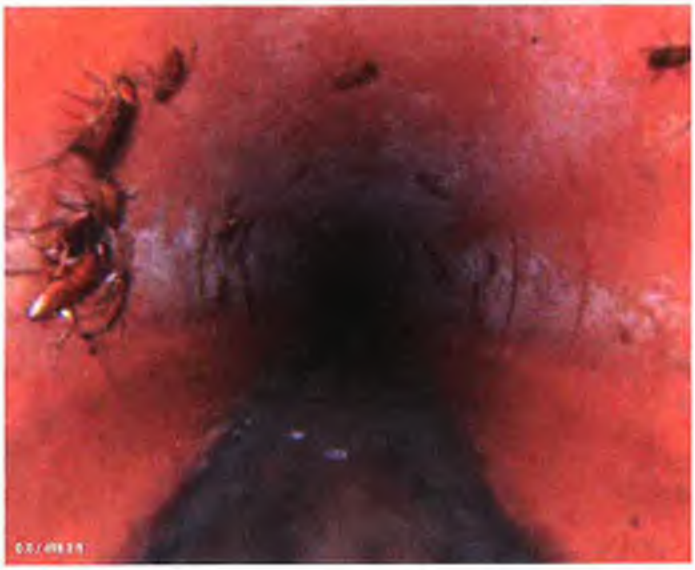
3
10
62
18

Say J46 - 56, J110 - 172, J228 - 246.5

346.87	CM	Crack Multiple	J347 - 350	1062	S 3
347.36	TBA	Tap Break-in Active		1073	NA
350.04	MGP	General Photo		1088	NA
363.67	MWL	Water Level	25%	1123	NA
369.05	TF	Tap Factory		1142	NA
371.08	CL	Crack Longitudinal	J371 - 374	1156	S 2
371.61	TF	Tap Factory		1167	NA
373.8	TF	Tap Factory		1181	NA
400.22	MGP	General Photo		1242	NA
412.01	MWL	Water Level	10%	1274	NA
428.49	TBA	Tap Break-in Active		1315	NA
428.49	RMC	Roots Medium Connection		1325	M 3
439.36	TF	Tap Factory		1356	NA
442.13	TF	Tap Factory		1371	NA
450.56	MGP	General Photo		1398	NA
490.3	MWL	Water Level	20%	1486	NA
493.55	FS	Fracture Spiral	J493.5 - MH 07-1004	1500	S 3
495.23	CM	Crack Multiple		1514	S 3
498.19	AMH	Manhole		1528	NA

07-1004

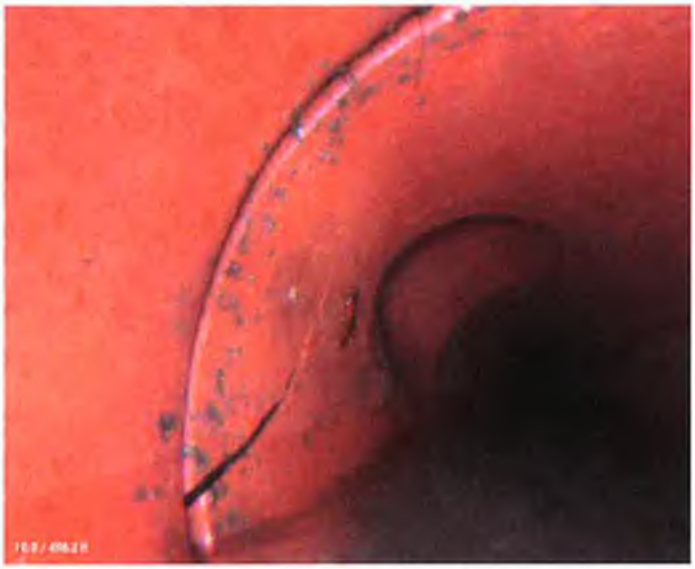
PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey



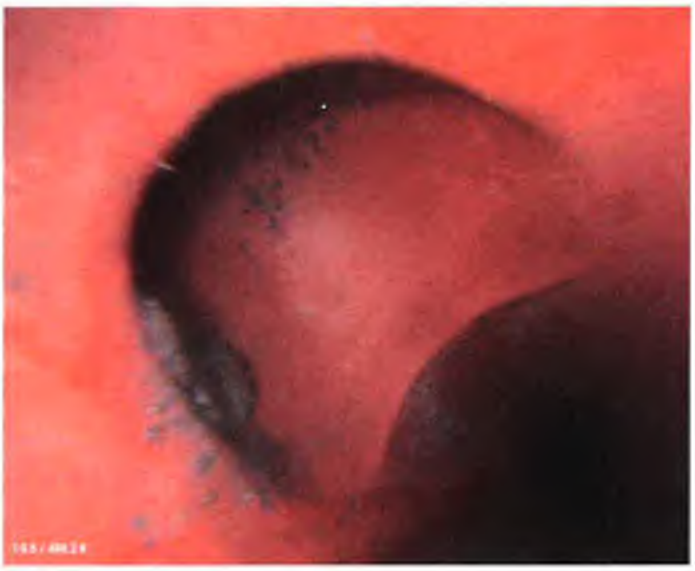
PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

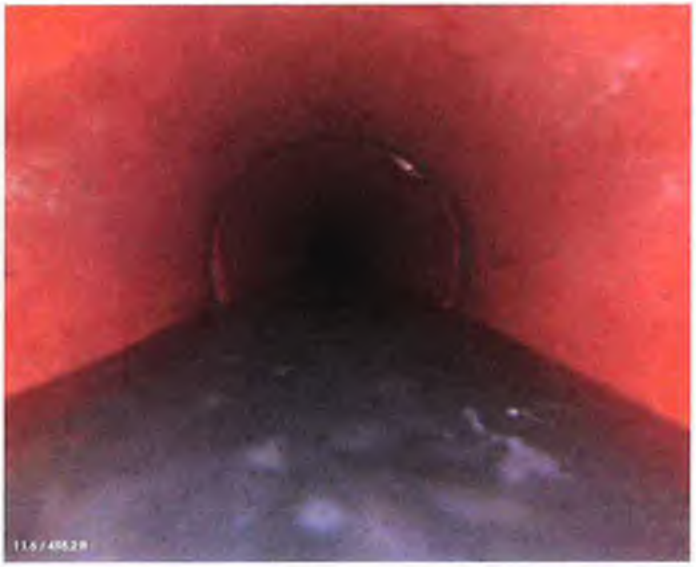
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	8.09
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	10.02
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	11
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

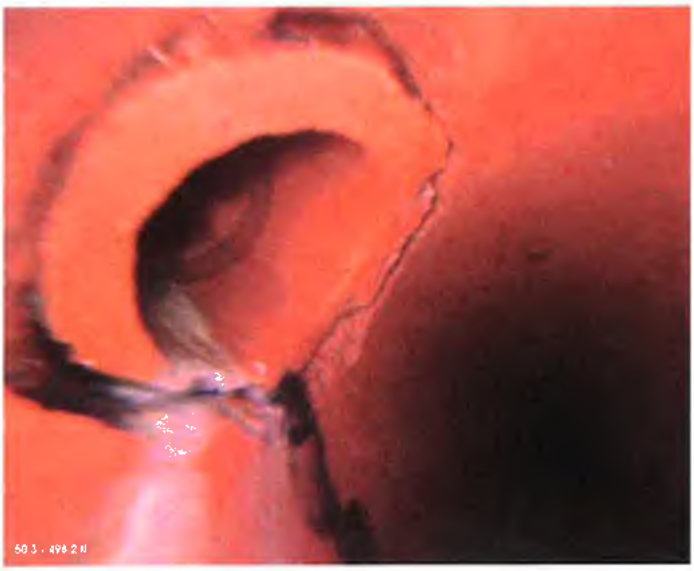


PACP Code:	TF
Description:	Tap Factory
Distance (ft):	10.47
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



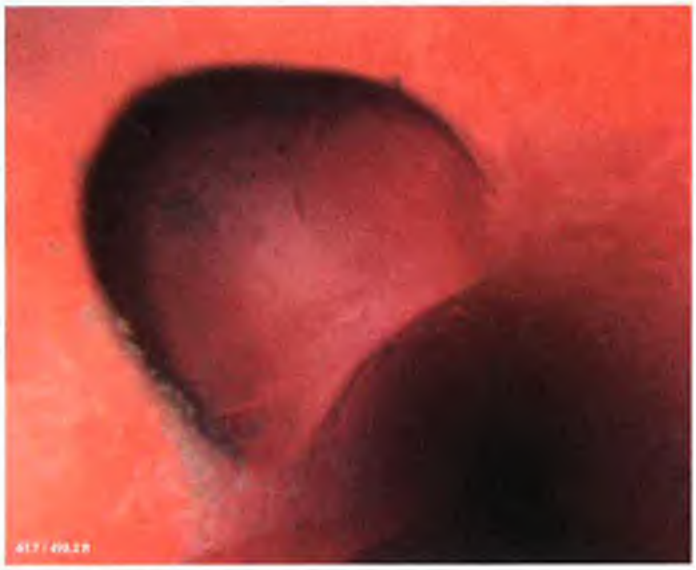
PACP Code:	MWL
Description:	Water Level
Distance (ft):	11.64
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	27.69
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

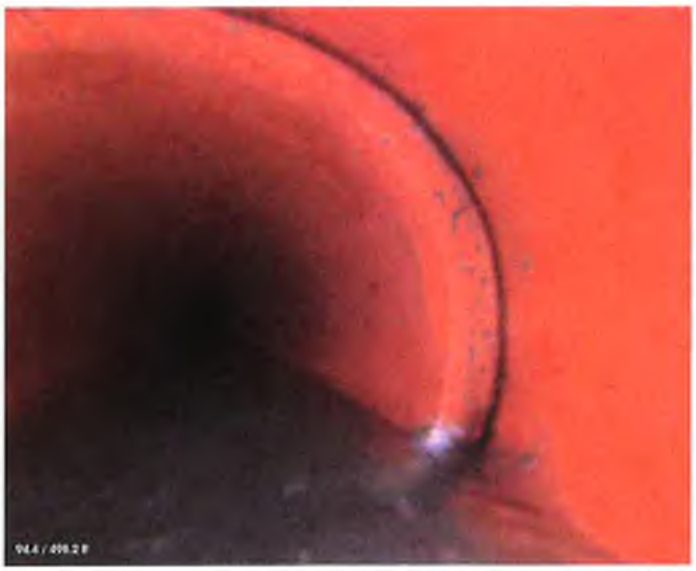


PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	50.25
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	59.21
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

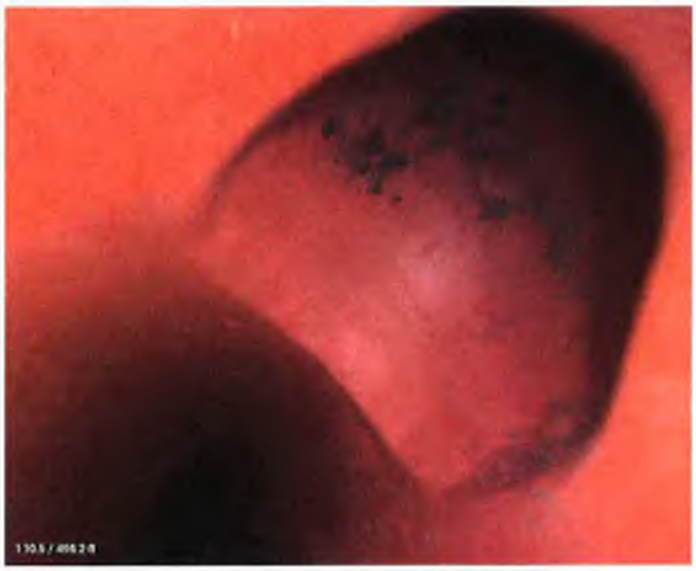


PACP Code:	TF
Description:	Tap Factory
Distance (ft):	61.66
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

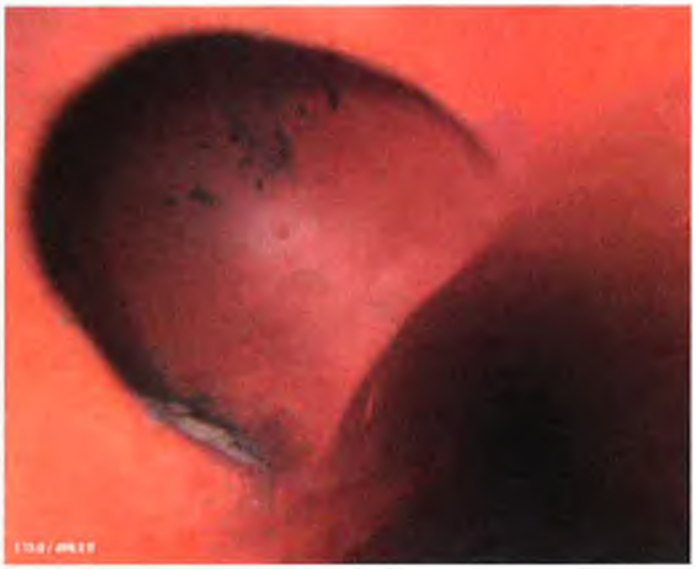


PACP Code:	JOM
Description:	Joint Offset Medium
Distance (ft):	94.39
Structural Grade:	1
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

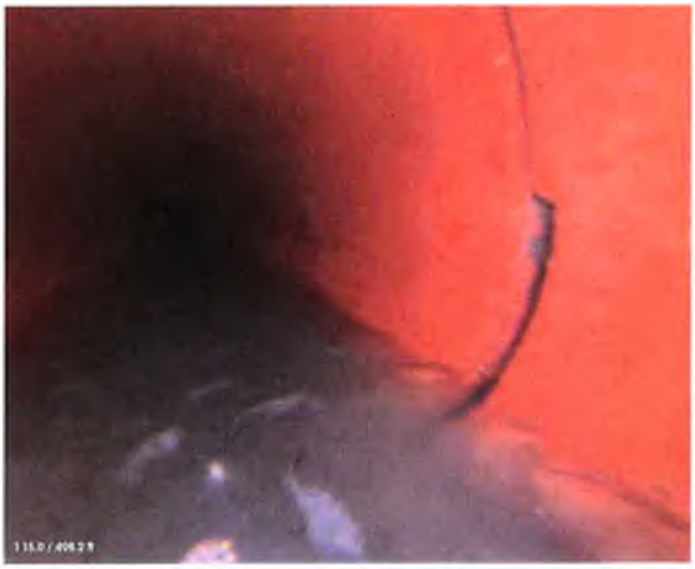
PACP Code:	MGP
Description:	General Photo
Distance (ft):	100.14
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	110.54
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



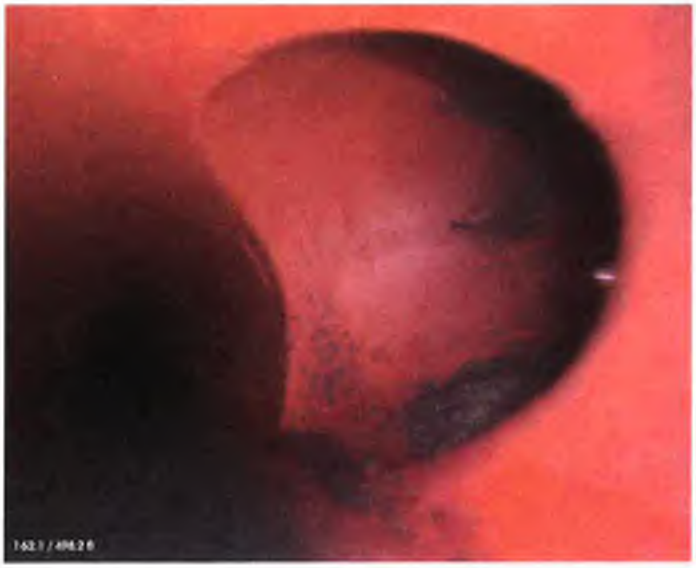
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	113.02
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



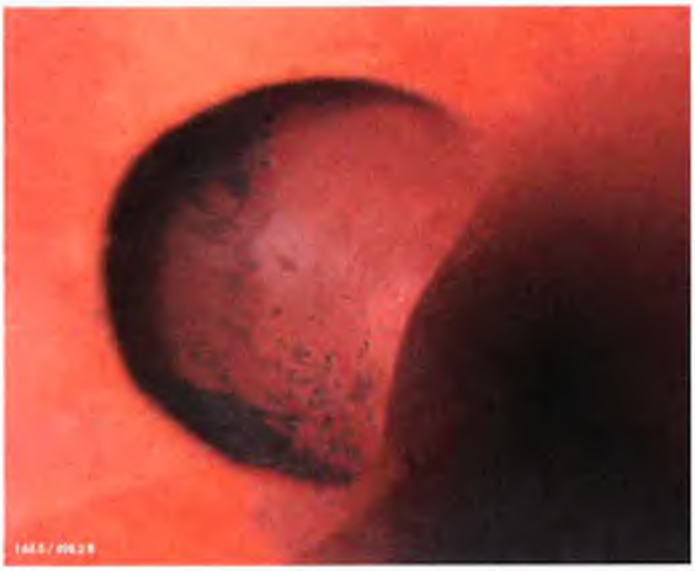
PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	115
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	3
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	128.36
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	150.23
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

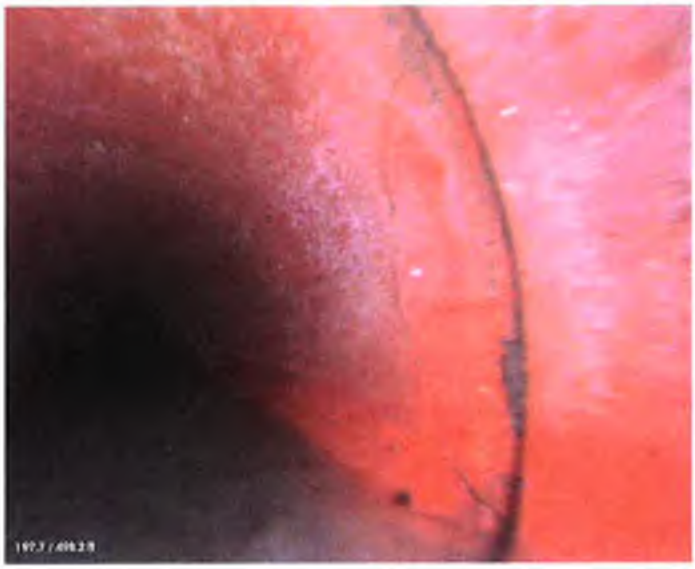


PACP Code:	TF
Description:	Tap Factory
Distance (ft):	162.08
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

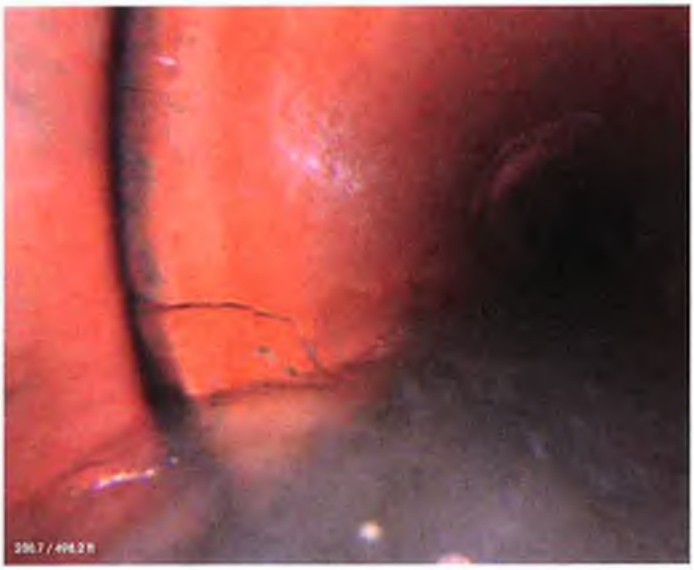


PACP Code:	TF
Description:	Tap Factory
Distance (ft):	164.5
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	9
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	FC
Description:	Fracture Circumferential
Distance (ft):	194.55
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	8
Clock To:	9
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	FM
Description:	Fracture Multiple
Distance (ft):	197.7
Structural Grade:	4
O&M Grade:	NA
Clock Start/From:	2
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

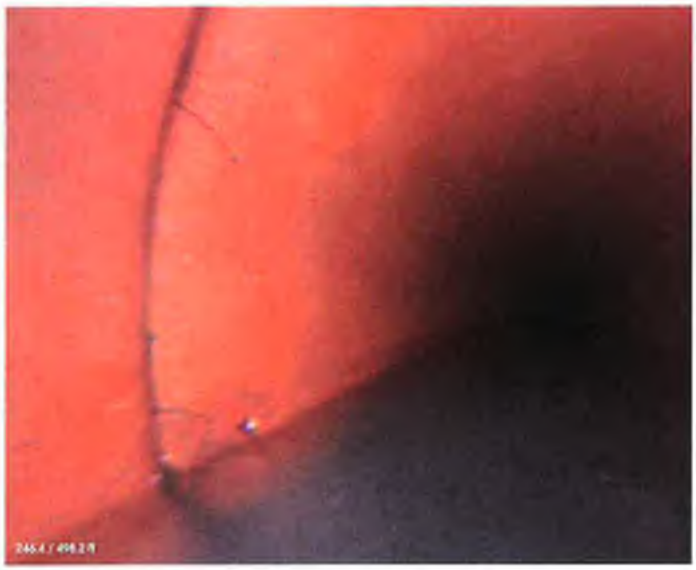


PACP Code:	FS
Description:	Fracture Spiral
Distance (ft):	200.73
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	8
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	202.03
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	213.71
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

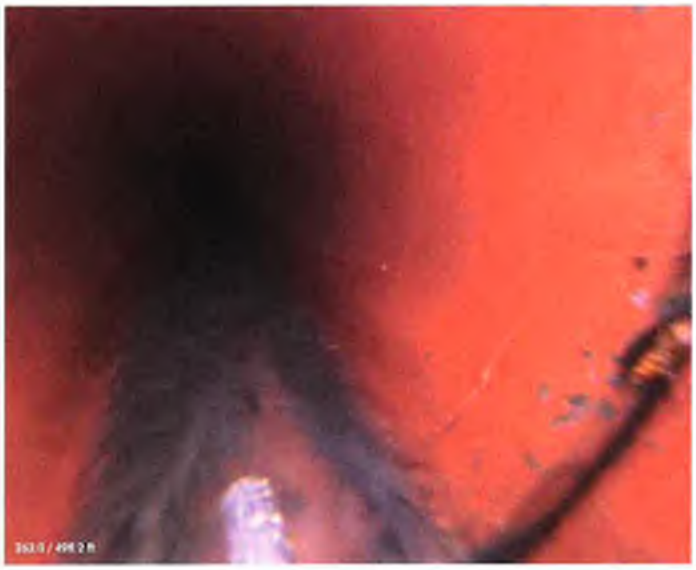
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	216.23
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



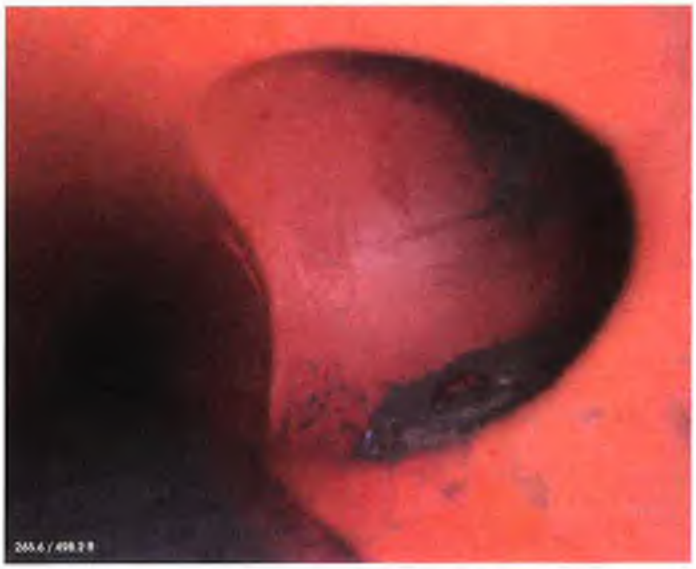
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	246.43
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	8
Clock To:	10
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	250.67
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

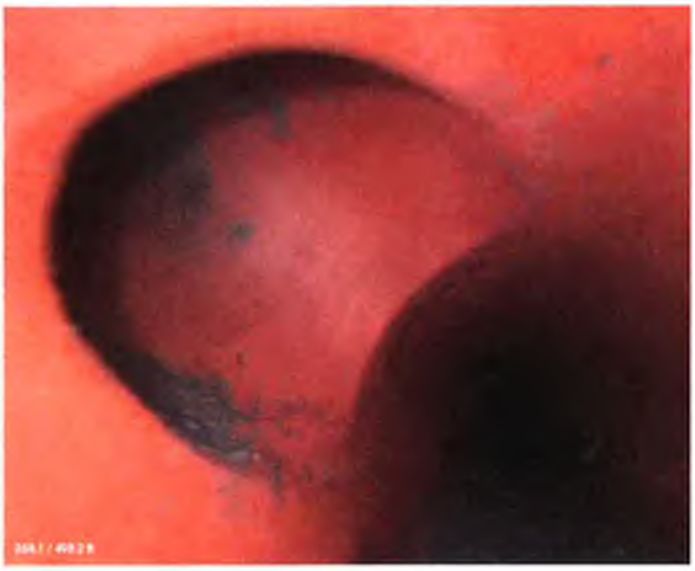
PACP Code:	MWL
Description:	Water Level
Distance (ft):	255.92
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



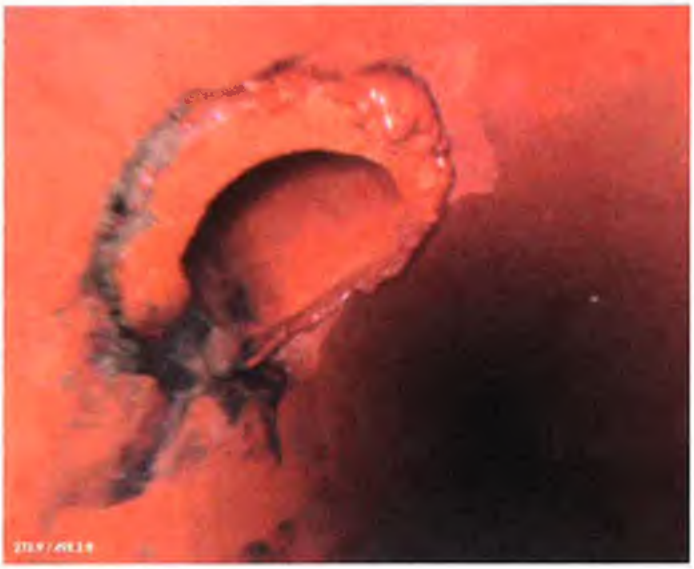
PACP Code:	CC
Description:	Crack Circumferential
Distance (ft):	261.99
Structural Grade:	1
O&M Grade:	NA
Clock Start/From:	4
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	265.61
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



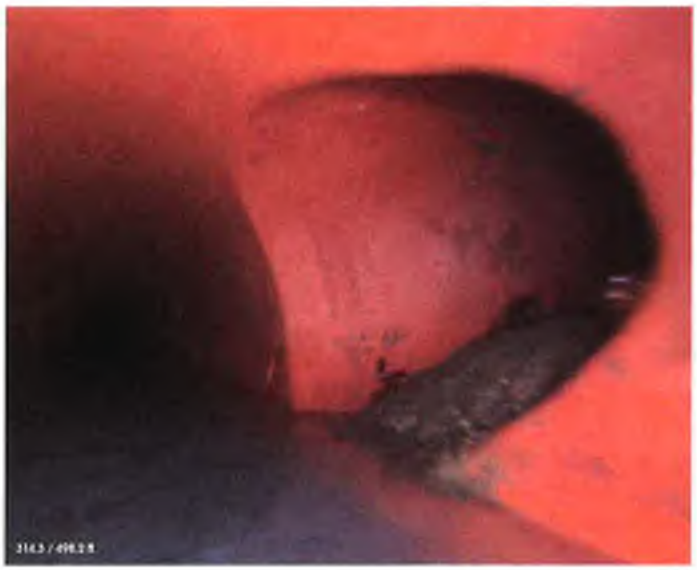
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	268.09
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	273.86
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

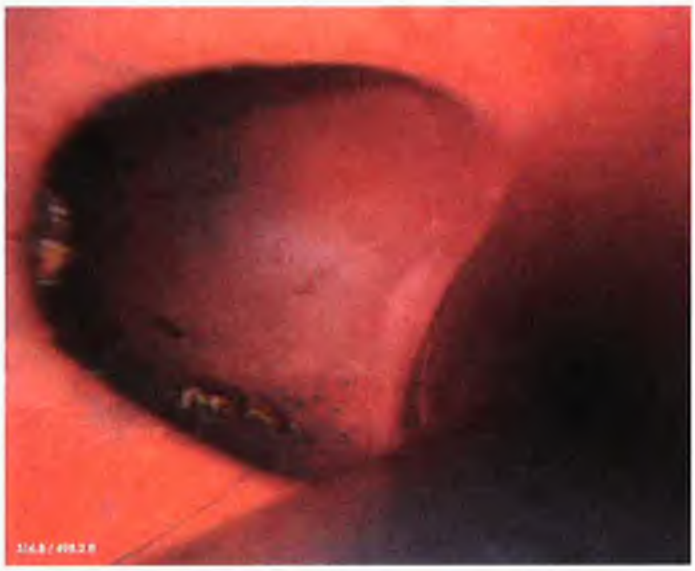
PACP Code:	CC
Description:	Crack Circumferential
Distance (ft):	279.43
Structural Grade:	1
O&M Grade:	NA
Clock Start/From:	8
Clock To:	9
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	301.74
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	314.29
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	315.15
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	316.78
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	321.83
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	335.18
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

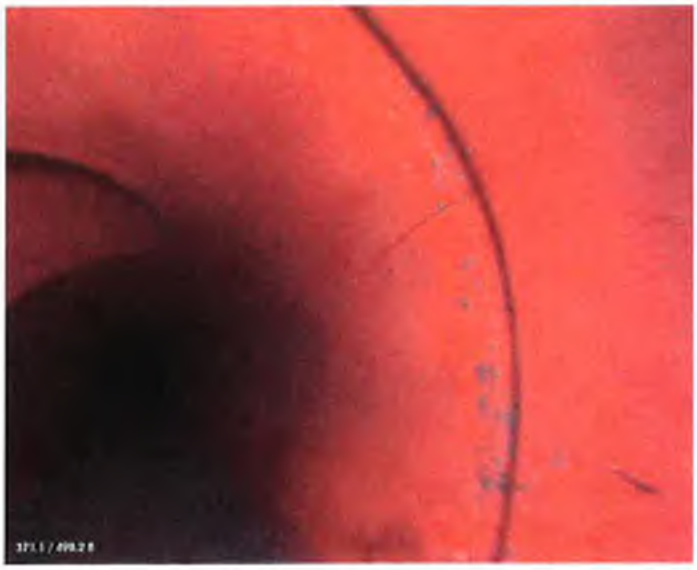
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	346.87
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	12
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	TBA
Description:	Tap Break-in Active
Distance (ft):	347.36
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

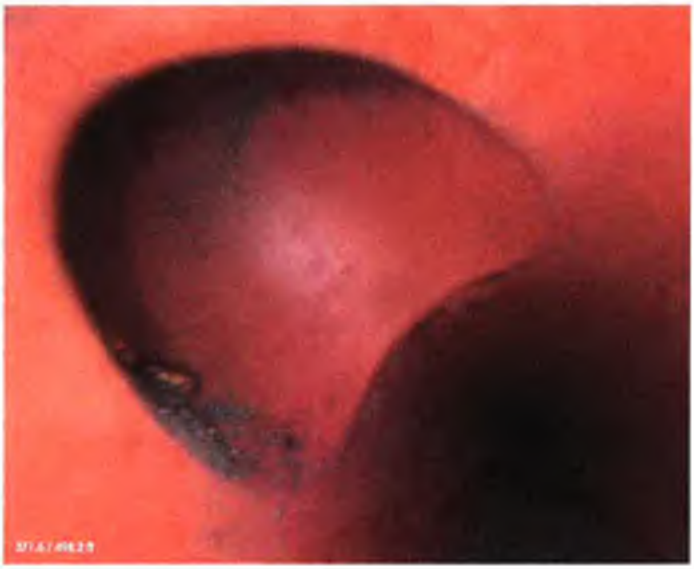
PACP Code:	MGP
Description:	General Photo
Distance (ft):	350.04
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	363.67
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	369.05
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	371.08
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

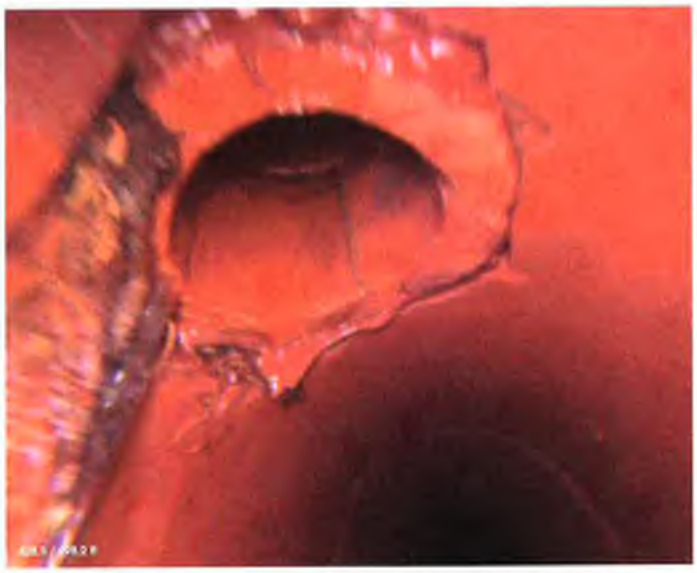


PACP Code:	TF
Description:	Tap Factory
Distance (ft):	371.61
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

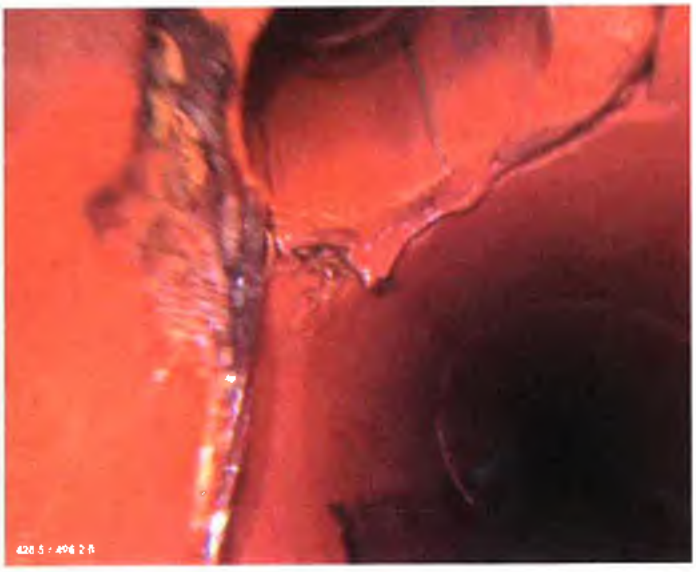
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	373.8
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	400.22
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

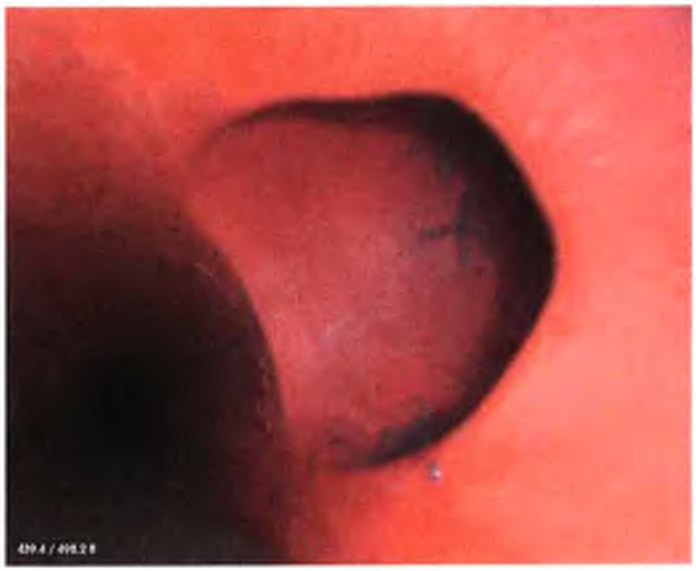
PACP Code:	MWL
Description:	Water Level
Distance (ft):	412.01
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



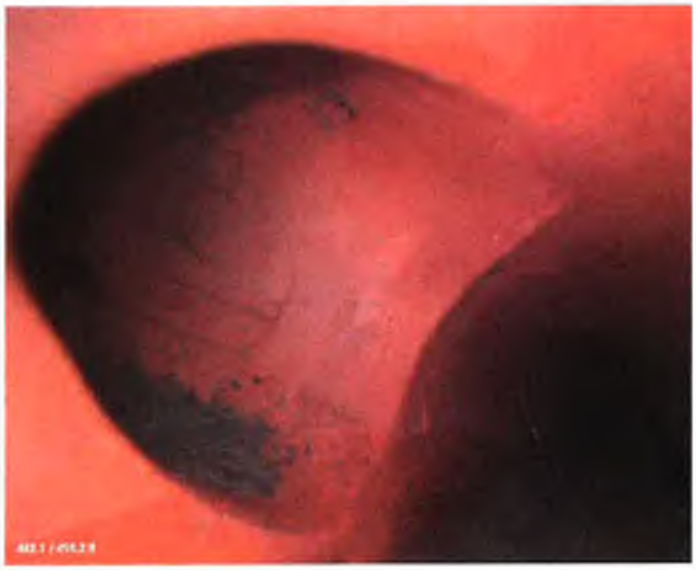
PACP Code:	TBA
Description:	Tap Break-in Active
Distance (ft):	428.49
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	RMC
Description:	Roots Medium Connection
Distance (ft):	428.49
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	10
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



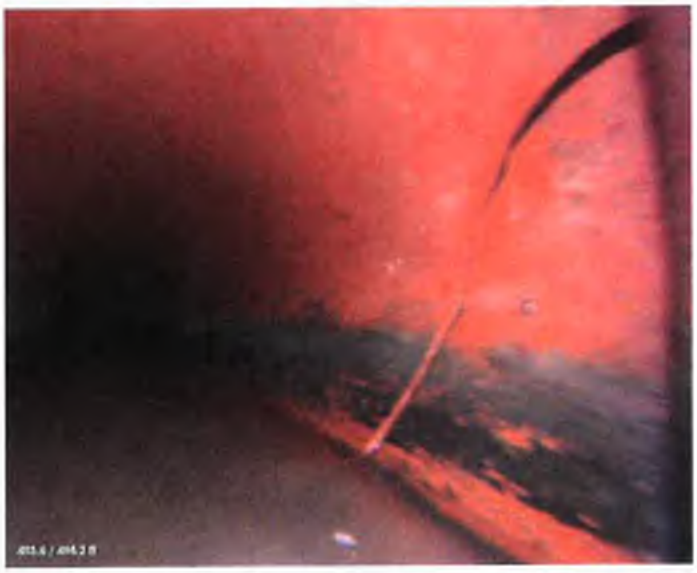
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	439.36
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	442.13
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	9
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

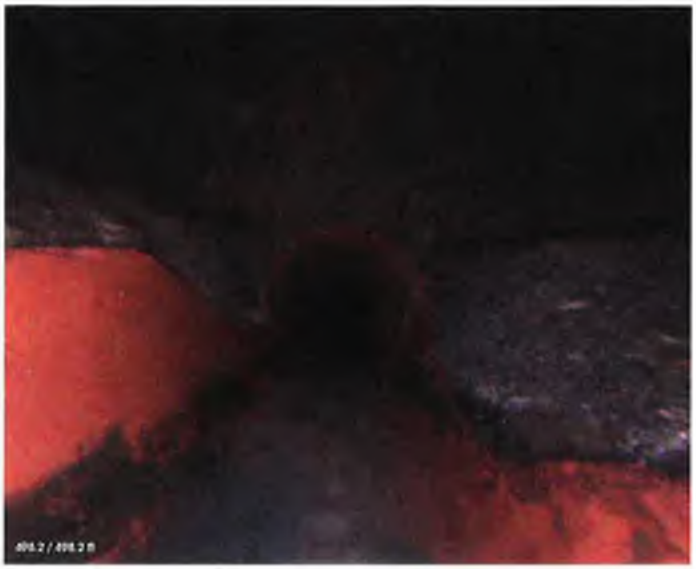
PACP Code:	MGP
Description:	General Photo
Distance (ft):	450.56
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	490.3
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	FS
Description:	Fracture Spiral
Distance (ft):	493.55
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	2
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	495.23
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	AMH
Description:	Manhole
Distance (ft):	498.19
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	End of survey

Profile/Photo Observation Report

RedZone ROBOTICS

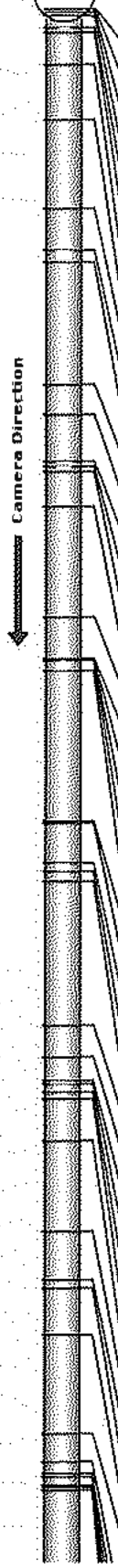
Date:	10/27/2009	Weather:	Dry		
Pipe Length (ft):	443	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12014	Surveyor:	JJC	PSR:	07-1004 to 07-1003
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	Campus Alley	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Alley	Tape/Media #:	NS23-706
Purpose:	Not Known	Dia/Height (in):	8 ✓
Use:	Sanitary	Material:	Vitrified Clay Pipe ✓
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Downstream

US MH: 07-1004 DS MH: 07-1003 Total Length Surveyed (ft): 443

- 7/8/19
- Rec: Sags (Multiple) for ~ 1/3 of reach:
  Open trench replacement; 443'

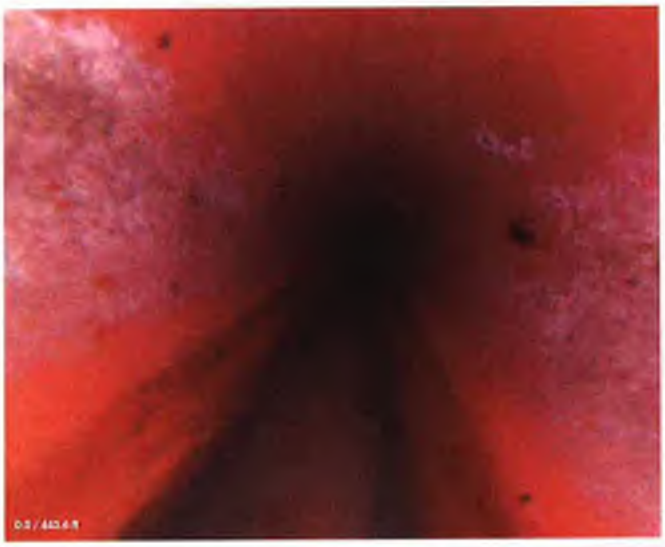
07-1004



Position	Code	Observation	Video (sec)	Grade	
0	AMH	Manhole	5	NA	
0	MWL	Water Level 10 %	13	NA	
0.85	VC	Vermin Cockroach	23	M 1	
1.46	FM	Fracture Multiple	34	S 4	Sag 15'
6.25	CL	Crack Longitudinal	54	S 2	
7.55	VC	Vermin Cockroach	67	M 1	
13.56	MWL	Water Level 40 %	87	NA	
26.89	MWL	Water Level 10 %	122	NA	
50.39	MGP	General Photo	177	NA	
60.78	TF	Tap Factory	206	NA	
63.38	TF	Tap Factory	221	NA	
93.42	MWL	Water Level 25 %	291	NA	Sag 20'
100.74	MWL	Water Level 50 %	314	NA	
112.38	TF	Tap Factory	345	NA	
113.62	MWL	Water Level	358	NA	
114.9	TF	Tap Factory	368	NA	
123.24	SSS	Surface Spalling	395	S 2	
150.22	MWL	Water Level 10 %	458	NA	
160.45	FL	Fracture Longitudinal	486	S 3	
160.45	HSV	Hole Soil Visible	495	S 5	
160.45	RMJ	Roots Medium Joint	505	M 3	
160.95	TBA	Tap Break-in Active	516	NA	
163.55	TF	Tap Factory	530	NA	
200.41	MGP	General Photo	613	NA	Sag 15'
200.77	MWL	Water Level 40 %	622	NA	
210.74	MWL	Water Level 25 %	650	NA	
212.49	TF	Tap Factory	662	NA	
215.08	TF	Tap Factory	677	NA	
250.42	MGP	General Photo	758	NA	Sag 30'
258.35	MWL	Water Level 40 %	782	NA	
264.02	TFA	Tap Factory Active	801	NA	
264.87	CC	Crack Circumferential	813	S 1	
266.64	TF	Tap Factory	827	NA	
268.55	VC	Vermin Cockroach	840	M 1	
278.66	MWL	Water Level 10 %	869	NA	
300.7	MWL	Water Level 20 %	922	NA	
312.49	TF	Tap Factory	953	NA	
314.93	TF	Tap Factory	968	NA	
326.24	CM	Crack Multiple	999	S 3	
350.4	MGP	General Photo	1057	NA	

07-1003

357.32	MWL	Water Level	40%	1079	NA	
360.17	CC	Crack Circumferential		1093	S 1	Sag:
360.91	MWL	Water Level	80%	1103	NA	55'
363.21	CS	Crack Spiral		1116	S 2	
363.6	TF	Tap Factory		1127	NA	
364.32	MCU	Camera Underwater		1137	M 4	AW 405'
443.63	AMH	Manhole		1305	NA	



PACP Code: AMH
Description: Manhole

Distance (ft): 0
Structural Grade: NA
O&M Grade: NA
Clock Start/From:
Clock To:
1st Value:
2nd Value:
Continuous Index:
Within 8" of Joint: False
Remarks: Begin survey

PACP Code: MWL
Description: Water Level

Distance (ft): 0
Structural Grade: NA
O&M Grade: NA
Clock Start/From:
Clock To:
1st Value:
2nd Value:
Continuous Index:
Within 8" of Joint: False
Remarks:

PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	0.85
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	FM
Description:	Fracture Multiple
Distance (ft):	1.46
Structural Grade:	4
O&M Grade:	NA
Clock Start/From:	11
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	6.25
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	7.55
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	13.56
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

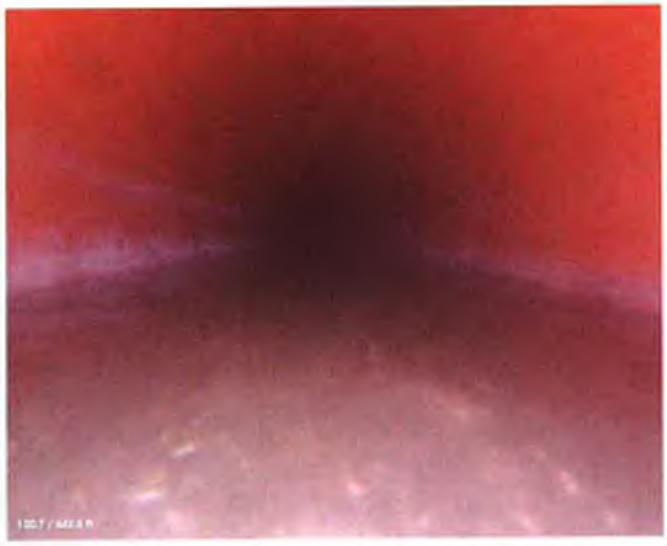
PACP Code:	MWL
Description:	Water Level
Distance (ft):	26.89
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	50.39
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

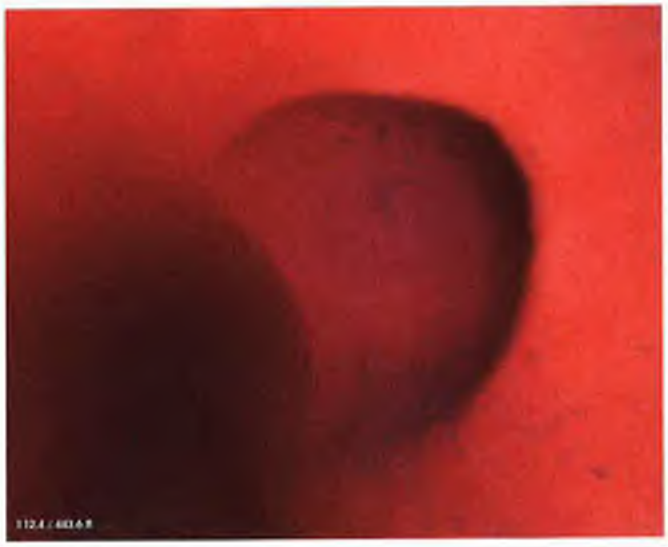
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	60.78
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	63.38
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	9
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	93.42
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



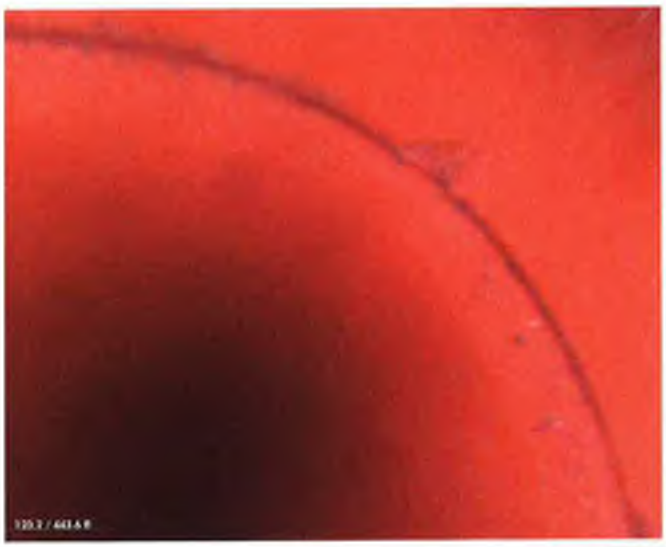
PACP Code:	MWL
Description:	Water Level
Distance (ft):	100.74
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	112.38
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

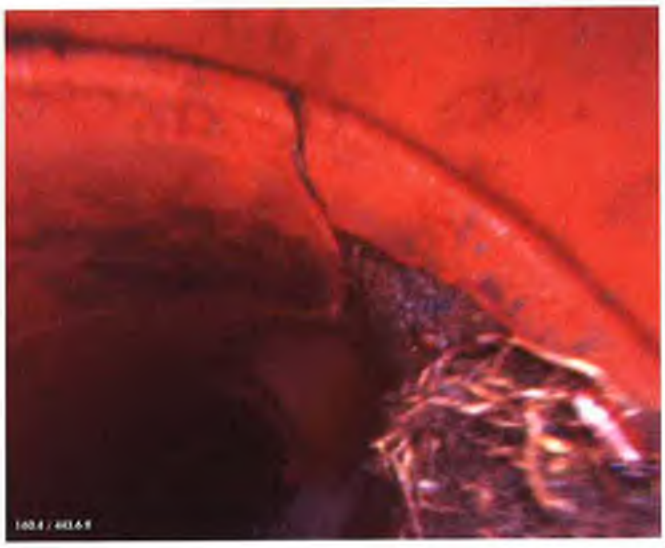
PACP Code:	MWL
Description:	Water Level
Distance (ft):	113.62
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	114.9
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

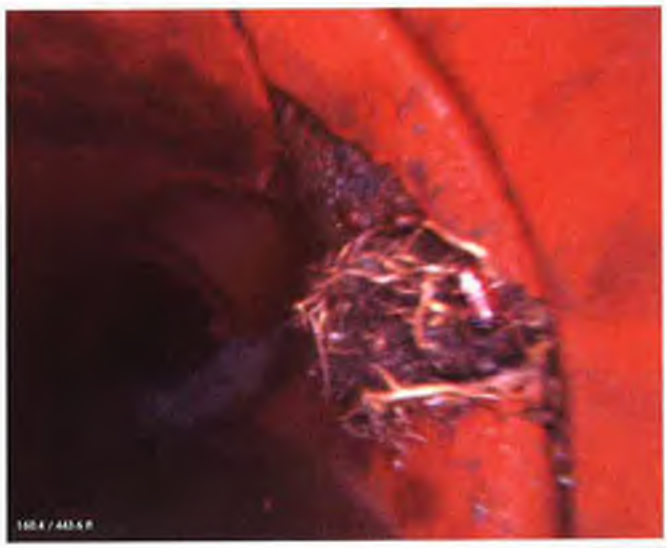


PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	123.24
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

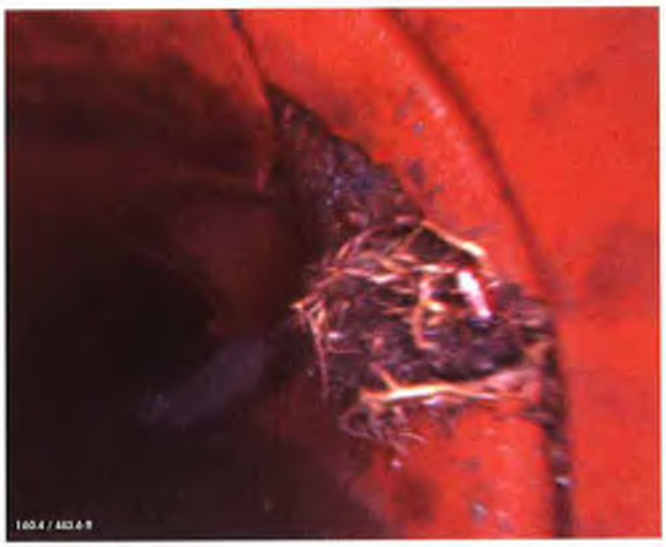
PACP Code:	MWL
Description:	Water Level
Distance (ft):	150.22
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	FL
Description:	Fracture Longitudinal
Distance (ft):	160.45
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	1
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

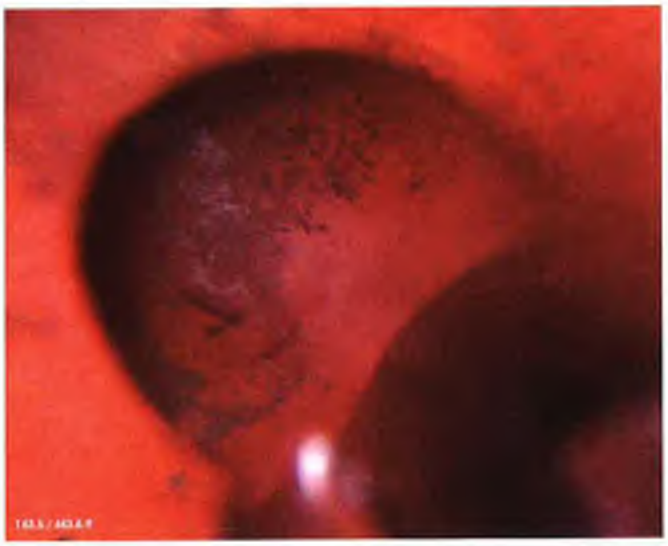


PACP Code:	HSV
Description:	Hole Soil Visible
Distance (ft):	160.45
Structural Grade:	5
O&M Grade:	NA
Clock Start/From:	2
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

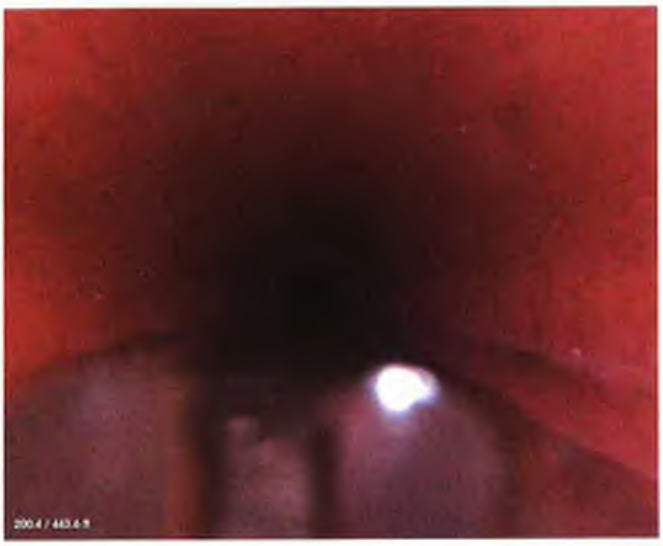


PACP Code:	RMJ
Description:	Roots Medium Joint
Distance (ft):	160.45
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	2
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	TBA
Description:	Tap Break-in Active
Distance (ft):	160.95
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



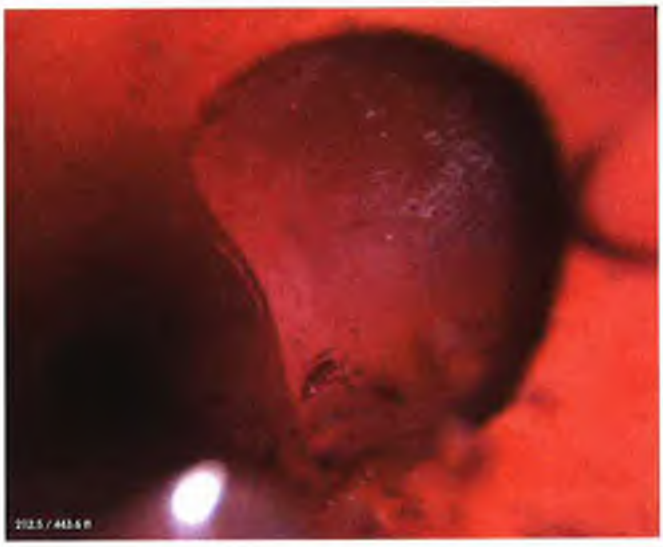
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	163.55
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



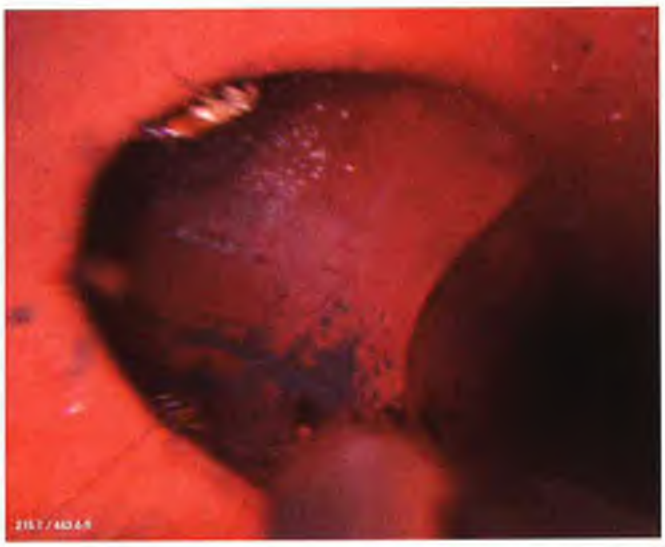
PACP Code:	MGP
Description:	General Photo
Distance (ft):	200.41
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	200.77
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	210.74
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



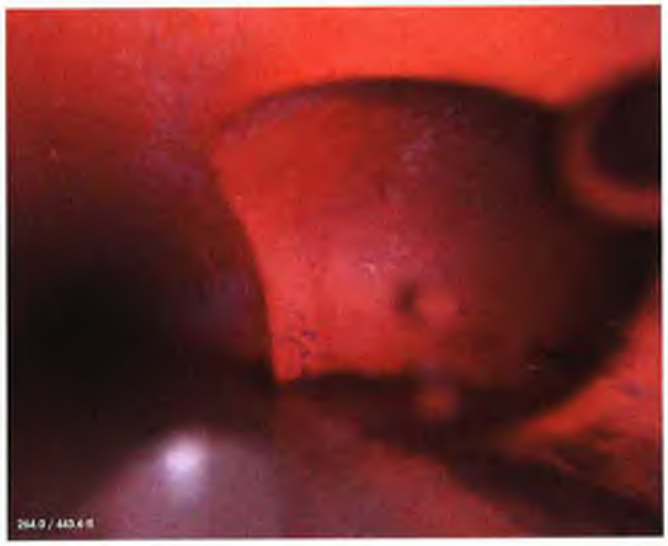
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	212.49
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	215.08
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	9
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	250.42
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	258.35
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TFA
Description:	Tap Factory Active
Distance (ft):	264.02
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

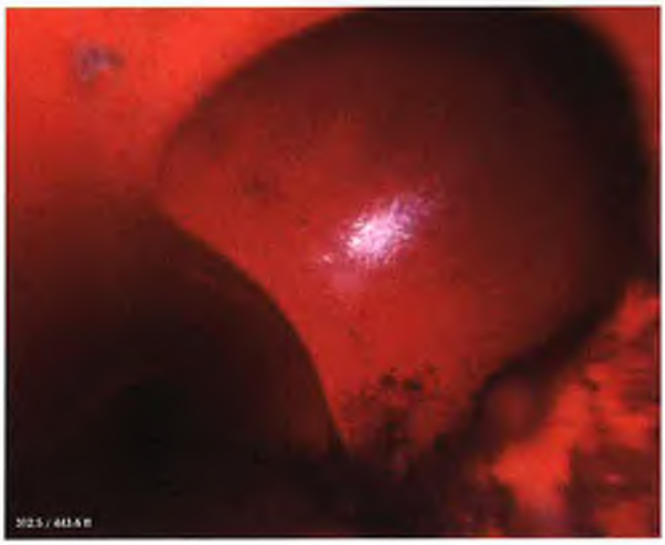
PACP Code:	CC
Description:	Crack Circumferential
Distance (ft):	264.87
Structural Grade:	1
O&M Grade:	NA
Clock Start/From:	2
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	266.64
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

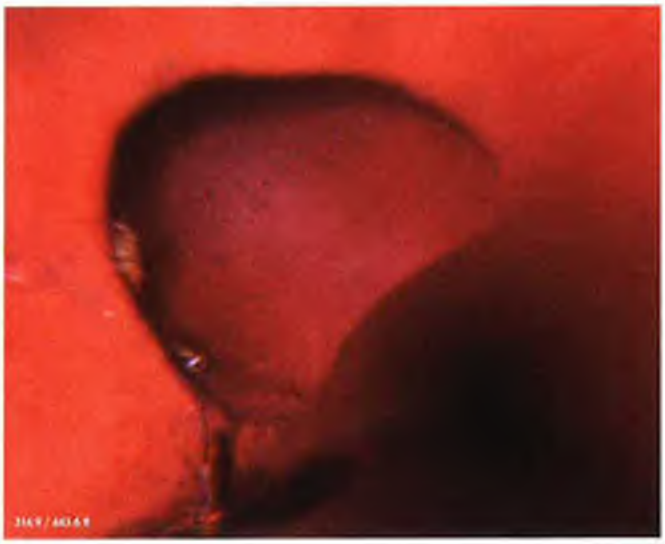
PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	268.55
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	278.66
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	300.7
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



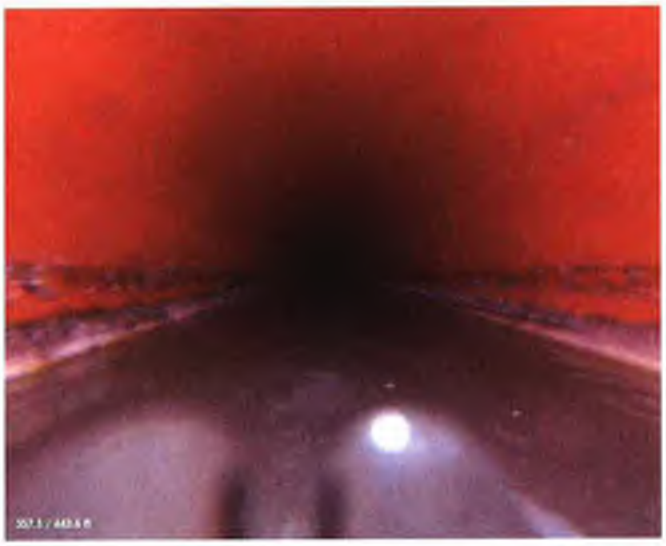
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	312.49
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



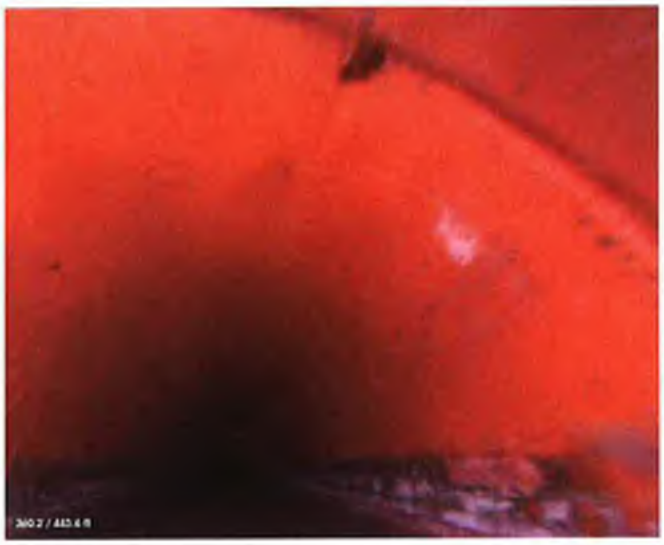
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	314.93
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	326.24
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	2
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	350.4
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



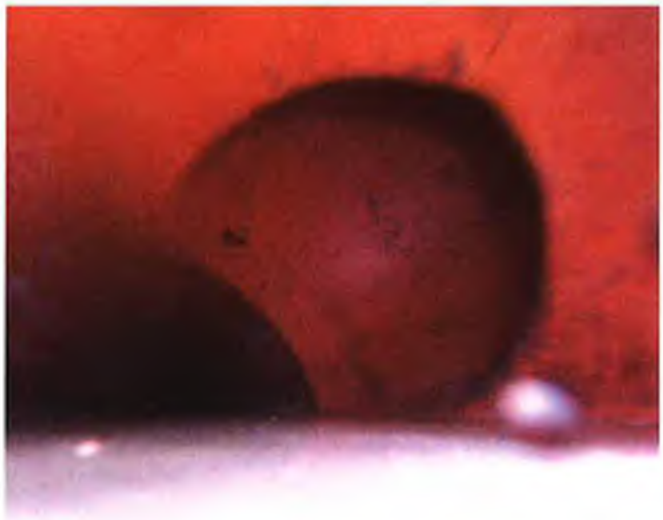
PACP Code:	MWL
Description:	Water Level
Distance (ft):	357.32
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	CC
Description:	Crack Circumferential
Distance (ft):	360.17
Structural Grade:	1
O&M Grade:	NA
Clock Start/From:	1
Clock To:	2
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	360.91
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	CS
Description:	Crack Spiral
Distance (ft):	363.21
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	11
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	363.6
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MCU
Description:	Camera Underwater
Distance (ft):	364.32
Structural Grade:	NA
O&M Grade:	4
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	AMH
Description:	Manhole
Distance (ft):	443.63
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	End of survey

Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/26/2009	Weather:	Dry		
Pipe Length (ft):	308	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12014	Surveyor:	JJC	PSR:	07-1003 to 07-1002
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	Dmv Parking Lot	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Parking Lot	Tape/Media #:	NS19-667
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Vitrified Clay Pipe
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Downstream

US MH: 07-1003 DS MH: 07-1002 Total Length Surveyed (ft): 308

Recommendation

1. Spot Repair J 39.5 to 81.5
2. CIPP Lining from (302-305)

*from US MH 07-1003

PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey

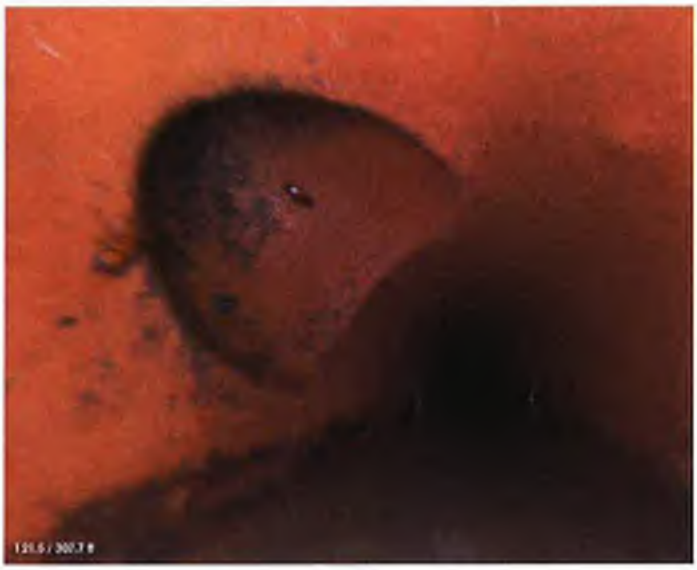
PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

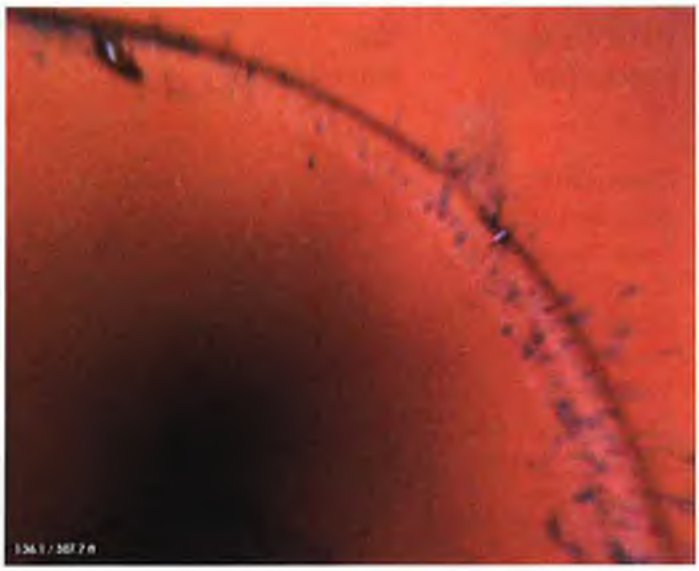
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	70.82
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	73.29
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

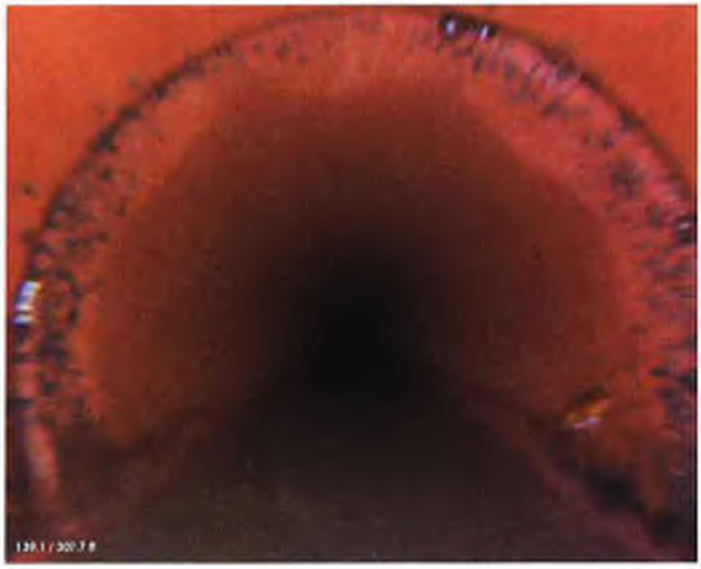
PACP Code:	MWL
Description:	Water Level
Distance (ft):	82.85
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



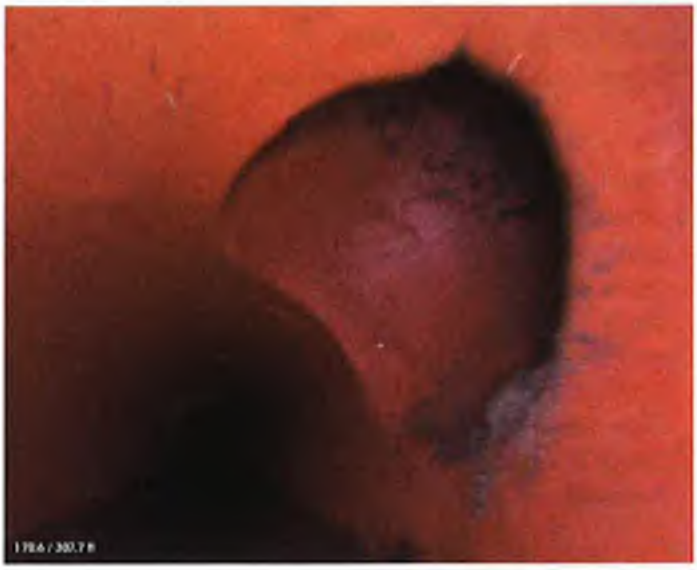
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	121.51
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



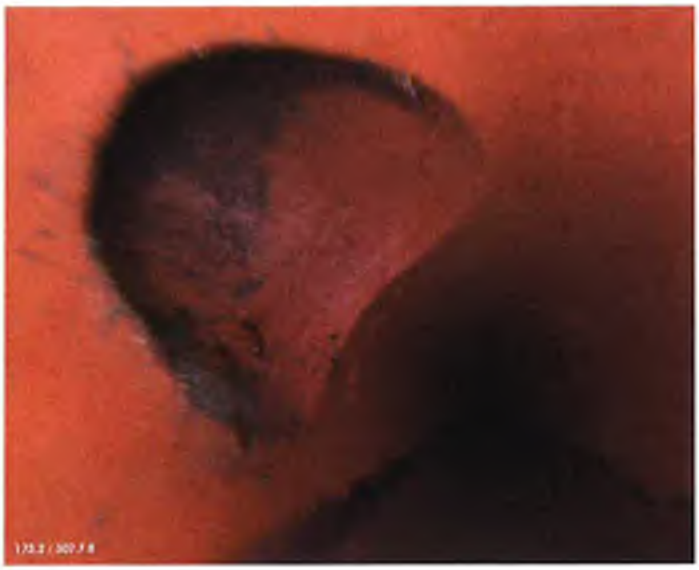
PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	136.06
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	139.05
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	170.62
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

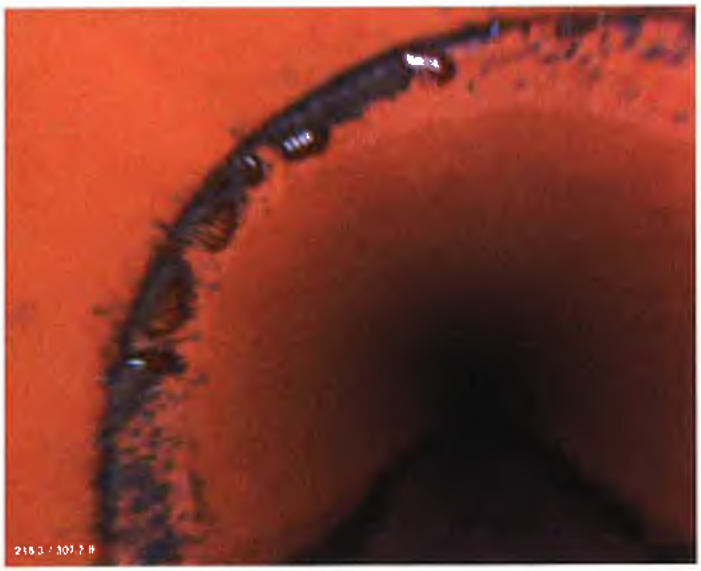


PACP Code:	TF
Description:	Tap Factory
Distance (ft):	173.16
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	174.25
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	2
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	200.44
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	212.09
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	1
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

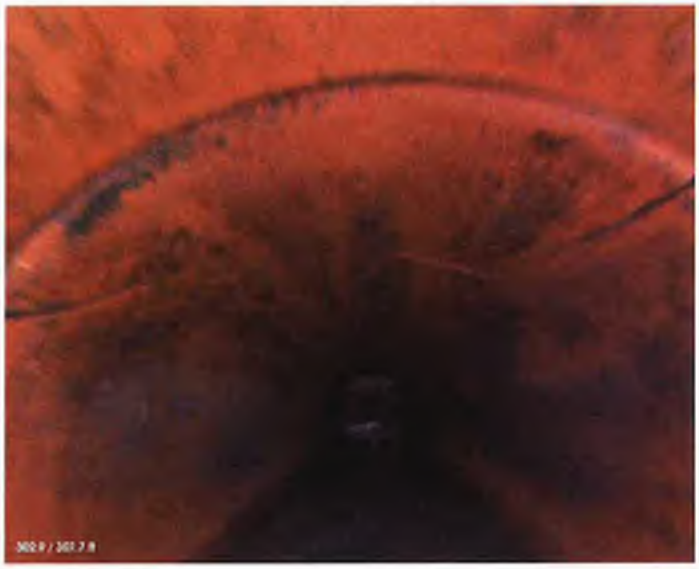


PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	218.28
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	250.28
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	262.18
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	273.43
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	FM
Description:	Fracture Multiple
Distance (ft):	302.85
Structural Grade:	4
O&M Grade:	NA
Clock Start/From:	10
Clock To:	2
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	AMH
Description:	Manhole
Distance (ft):	307.72
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	End of survey

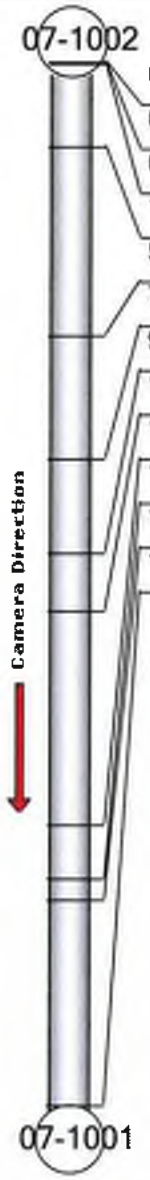
Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/26/2009	Weather:	Dry		
Pipe Length (ft):	193	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12014	Surveyor:	JJC	PSR:	07-1002 to 07-1001
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	4th St.	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Light Highway	Tape/Media #:	NS11-1187
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Polyvinyl Chloride
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Downstream

US MH: 07-1002 DS MH: 07-1001 Total Length Surveyed (ft): 193

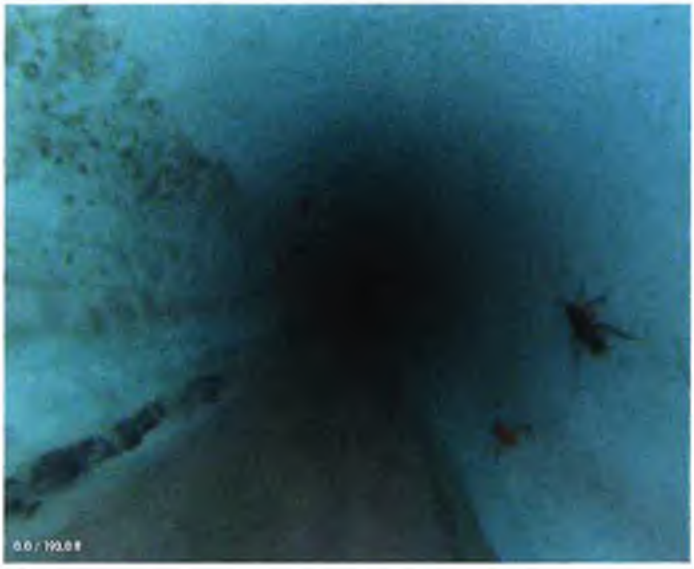


Position	Code	Observation		Video (sec)	Grade
0	AMH	Manhole		5	NA
0	MWL	Water Level	5%	13	NA
0.22	VC	Vermin Cockroach		22	M 1
15.63	MWL	Water Level	40% (38.5 - 151.5)	63	NA
50.54	MGP	General Photo		141	NA
73.28	MCU	Camera Underwater		194	M 4
90.74	MWL	Water Level	5%	237	NA
101.36	MWL	Water Level	50%	267	NA
141.05	MCU	Camera Underwater		354	M 4
150.88	MGP	General Photo		382	NA
154.9	MWL	Water Level	20%	399	NA
193.01	AMH	Manhole		483	NA

Recommendation

- due to more than half the pipe containing flow @ more that 30% Crossectional Area,

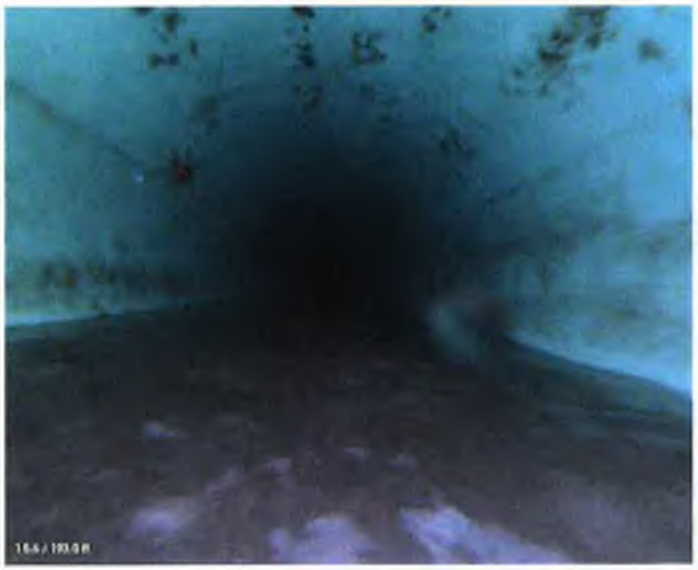
Open Trench Pipe Replacement (193ft)



PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey

PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	0.22
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MWL
Description:	Water Level
Distance (ft):	15.63
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

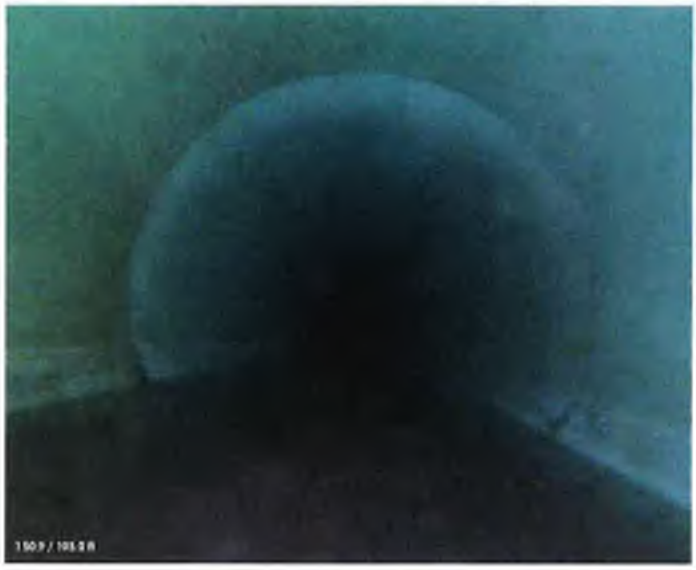
PACP Code:	MGP
Description:	General Photo
Distance (ft):	50.54
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MCU
Description:	Camera Underwater
Distance (ft):	73.28
Structural Grade:	NA
O&M Grade:	4
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	90.74
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	101.36
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MCU
Description:	Camera Underwater
Distance (ft):	141.05
Structural Grade:	NA
O&M Grade:	4
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MGP
Description:	General Photo
Distance (ft):	150.88
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	154.9
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	AMH
Description:	Manhole
Distance (ft):	193.01
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	End of survey

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level I
Inspection Status:	S.I. (surface inspection)

Date: 7 / 24 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07-1001

Surveyed by: S-L

Street: Campus Dr.

Cert. no.:

MH Location Details:

Campus / 4th Inter.

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Insl. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:

Assumes outgoing pipe @ 6:00

MH Condition Comments:

Sound

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 8 / 2019

Sheet: 6 / 30

MANHOLE NO.: 07 - 1004

Surveyed by: Danny and Johnny

Street: Grapevine Drive

Cert. no.:

MH Location Details:
On Grapevine Drive close to intersection of Campus Drive and Grapevine Drive

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

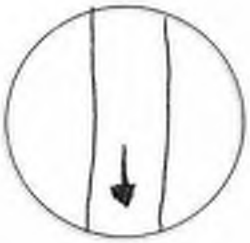
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Replace - Brick MH

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7 / 24 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07-1005

Surveyed by: J-L

Street: Plum Tree Dr.

Cert. no.:

MH Location Details:

Adj to 734 Plum Tree Dr. Dentist

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:

Assumes outgoing pipe @ 6:00

MH Condition Comments:

- Small I/F on wall
- otherwise good

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 8 / 2019

Sheet: 7 / 30

MANHOLE NO.: 07 _ 1006

Surveyed by: Danny and Johnny

Street: Alley way

Cert. no.:

MH Location Details:
By bend and tree in Alleyway across from Orchard Drive

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown N/A

Cone Condition: Defective / Sound / Unknown

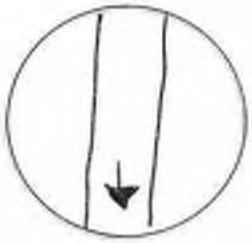
Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / ~~Sound~~ / Unknown

Okay

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Brick Manhole - replace

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Appendix E: Plumtree Drive Alleys Pipeline Project Reference Materials

Plumtree Drive Alleys Pipeline Project Cost Estimate

Reach No.	Item	Action		Cost
Number	Reach			
1	07-1016_07-1017_12/1/2010_D	Lining		$ 31,000.00
2	07-1015_07-1014_12/1/2010_D	Lining		$ 9,000.00
3	07-1012_07-1013_12/1/2010_U	Lining		$ 28,000.00
4	07-1011_07-1012_12/1/2010_D	Spot Repair + Lining		$ 45,000.00
5	07-1011_07-1010_12/1/2010_D	Lining		$ 33,000.00
6	07-1010_07-1018_12/1/2010_U	Spot Repair + Lining		$ 74,000.00
7	07-1018_07-1009_12/1/2010_D	Spot Repair + Lining		$ 34,000.00
8	07-1019_07-1018_12/1/2010_D	Spot Repair + Lining		$ 64,000.00
9	07-1020_07-1019_12/1/2010_U	Replacement		$ 96,000.00
10	07-1021_07-1020_12/1/2010_D	Lining		$ 40,000.00
11	07-1022_07-1021-a_12/1/2010_D	Spot Repair + Lining		$ 63,000.00
12	07-1024_07-1023_12/1/2010_U	Replacement		$ 58,000.00
	Manholes			
	07_1013	Repair		$ 2,000.00
	07_1014	Repair		$ 2,000.00
	07_1015	Repair		$ 2,000.00
	07_1017	Repair		$ 2,000.00
	07_1021A	Repair		$ 2,000.00
	07_1024	Replace		$ 8,000.00
	07_1023	Replace		$ 8,000.00
	07_1021	Replace		$ 8,000.00
	07_1020	Replace		$ 8,000.00
	07_1019	Replace		$ 8,000.00
	07_1018	Replace		$ 8,000.00
	07_1010	Replace		$ 8,000.00
	07_1011	Replace		$ 8,000.00
	07_1009	Replace		$ 8,000.00
	Total Construction Cost			$ 657,000.00
	Engineering & Construction Management		25%	$ 164,000.00
	Contingencies		20%	$ 131,000.00
	Administrative		5%	$ 33,000.00
	CIP Estimate			**$ 985,000.00**

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset: 07-1016 to 07-1017

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1017 to 07-1016	07-1016	07-1017	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		309	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	11:51 AM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		309
Media Label	Reverse Setup	Work Order No	Additional Info	
NS23-1469	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
29	29	0
Overall Index	Structural Index	Maintenance Index
3.22	3.22	0
Overall Quick	Structural Quick	Maintenance Quick
4531	4531	0000

Recommendation

- the amount of CIPP repairs exceed reasonable isolated CIPP Lining (do entire length)

① CIPP Entire length of pipe (330

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 5% of cross sectional area (5%)
-	20.2	[TF] Tap Factory at 10 o'clock
-	37.8	[MWL] Water Level 15% of cross sectional area
-	43.5	[TF] Tap Factory at 3 o'clock
-	50.6	[MGP] General Photo
2	69.9	[FC] Fracture Circumferential from 4 to 9 o'clock within 8" of joint J68 - 72
-	82.3	[TF] Tap Factory at 10 o'clock
-	100.2	[MGP] General Photo
-	105.4	[TF] Tap Factory at 2 o'clock
-	144.1	[TF] Tap Factory at 10 o'clock
4	149.9	[FM] Fracture Multiple from 8 to 4 o'clock within 8" of joint J148 - 153
-	150.5	[MGP] General Photo
4	155	[FM] Fracture Multiple from 8 to 4 o'clock within 8" of joint J152 - 157
-	163.3	[MWL] Water Level 5% of cross sectional area 5%
-	177.5	[TF] Tap Factory at 2 o'clock
3	188.9	[FL] Fracture Longitudinal at 8 o'clock within 8" of joint J187 - 192
-	200.2	[MGP] General Photo
-	205.8	[TF] Tap Factory at 10 o'clock
4	216.4	[FM] Fracture Multiple from 9 to 3 o'clock within 8" of joint J 215 - 220
2	242.4	[CL] Crack Longitudinal at 3 o'clock within 8" of joint (J 242.5 - 245.5)
-	244.2	[TF] Tap Factory at 2 o'clock
2	250.3	[CL] Crack Longitudinal at 2 o'clock within 8" of joint (J 247.5 - 252.5)
-	250.3	[MGP] General Photo
4		[FM] Fracture Multiple from 6 to 6 o'clock within 8" of joint (J253 - 258)
-	267.4	[TF] Tap Factory at 10 o'clock J 262.5 - 267.5
-	294.6	[MWL] Water Level 20% of cross sectional area (20%)
4	299	[FM] Fracture Multiple from 12 to 3 o'clock within 8" of joint
-	300.2	[MGP] General Photo
-	300.2	[MWL] Water Level 40% of cross sectional area
-	309.4	[AMH] Manhole Remarks: End of survey

Camera Direction

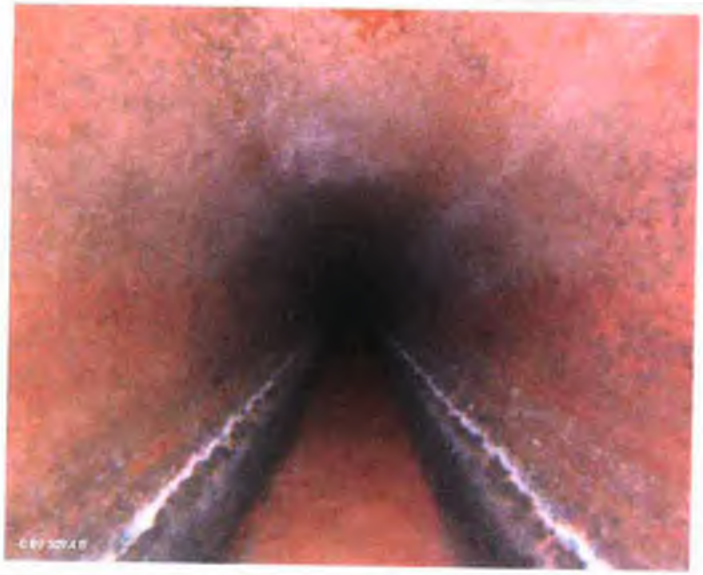
07-1016

07-1017

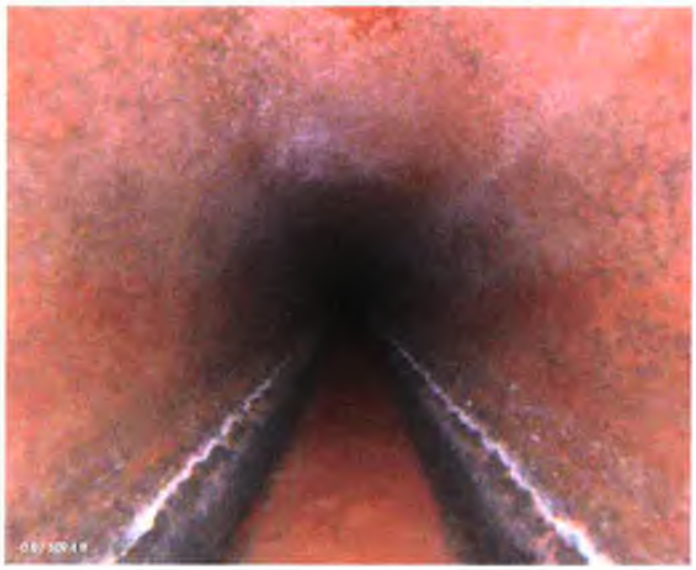
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	5% of cross sectional area				5	☐		
-	20.2	TF	Tap Factory	at 10 o'clock		3			☐	10	
-	37.8	MWL	Water Level	15% of cross sectional area				15	☐		

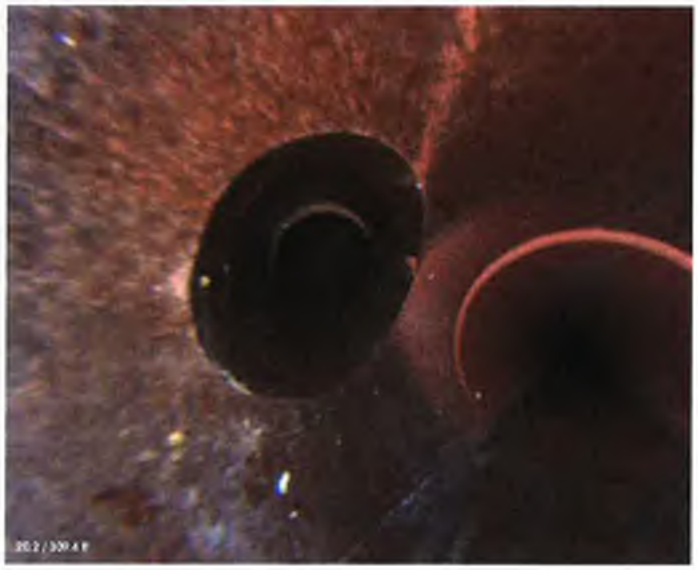
-	43.5	TF	Tap Factory	at 3 o'clock		4			☐	3	
-	50.6	MGP	General Photo						☐		
2	69.9	FC	Fracture Circumferential	from 4 to 9 o'clock within 8" of joint					☑	4	9
-	82.3	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	100.2	MGP	General Photo						☐		
-	105.4	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	144.1	TF	Tap Factory	at 10 o'clock		4			☐	10	
4	149.9	FM	Fracture Multiple	from 8 to 4 o'clock within 8" of joint					☑	8	4
-	150.5	MGP	General Photo						☐		
4	155	FM	Fracture Multiple	from 8 to 4 o'clock within 8" of joint					☑	8	4
-	163.3	MWL	Water Level	5% of cross sectional area				5	☐		
-	177.5	TF	Tap Factory	at 2 o'clock		4			☐	2	
3	188.9	FL	Fracture Longitudinal	at 8 o'clock within 8" of joint					☑	8	
-	200.2	MGP	General Photo						☐		
-	205.8	TF	Tap Factory	at 10 o'clock		4			☐	10	
4	216.4	FM	Fracture Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3
2	242.4	CL	Crack Longitudinal	at 3 o'clock within 8" of joint					☑	3	
-	244.2	TF	Tap Factory	at 2 o'clock		4			☐	2	
2	250.3	CL	Crack Longitudinal	at 2 o'clock within 8" of joint					☑	2	
-	250.3	MGP	General Photo						☐		
4	254.9	FM	Fracture Multiple	from 6 to 6 o'clock within 8" of joint					☑	6	6
-	267.4	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	294.6	MWL	Water Level	20% of cross sectional area				20	☐		
4	299	FM	Fracture Multiple	from 12 to 3 o'clock within 8" of joint					☑	12	3
-	300.2	MGP	General Photo						☐		
-	300.2	MWL	Water Level	40% of cross sectional area				40	☐		
-	309.4	AMH	Manhole	Remarks: End of survey					☐		



PACP Code:	AMH		
Description:	Manhole		
Image Name:	05d5bfd6-e12e-41ee-b7b2-4be29a61b25c_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

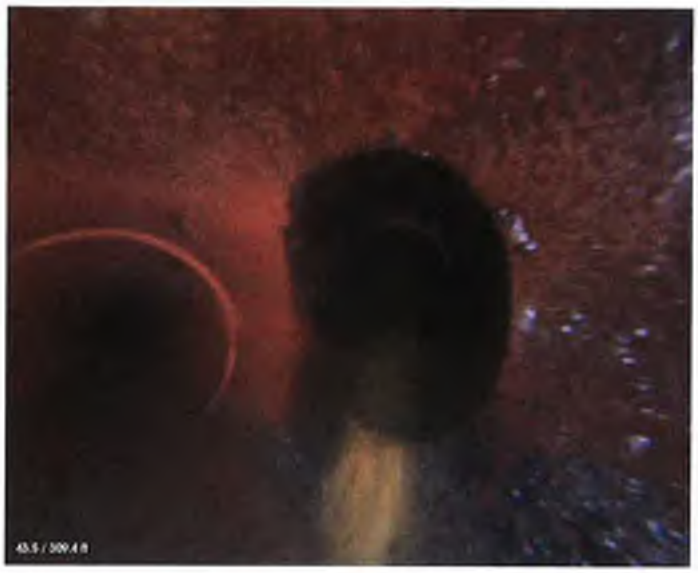


PACP Code:	MWL		
Description:	Water Level		
Image Name:	6fa4b75e-f91b-451c-96c6-6e8cd4b5be4f_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	Tap Factory		
Image Name:	5c774175-e883-4242-a988-03dfdee2a60e_20.2-TF.jpg		
Distance (ft):	20.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	3	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	119ff0fe-4c1e-47fd-994d-d389633bce5d_37.8-MWL.jpg		
Distance (ft):	37.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	15		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



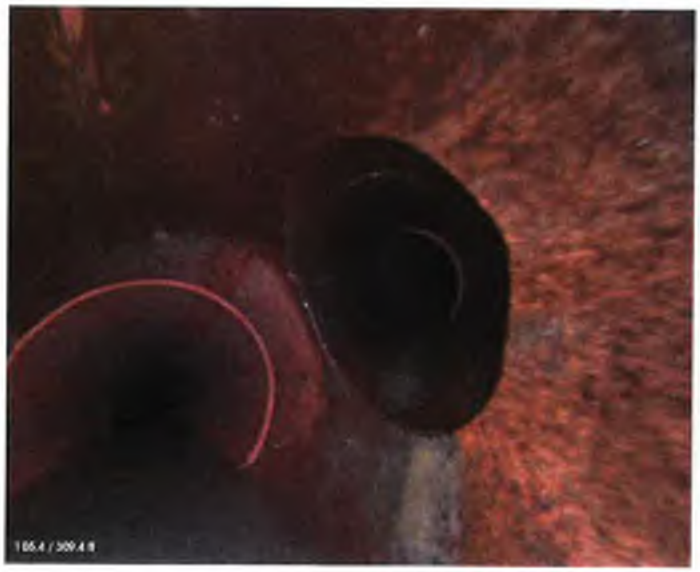
PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**23db79fa-c5d8-4c46-9eab-360a8c5ee2b0_43.5-TF.jpg**		
Distance (ft):	**43.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**9127b717-8ef0-443a-a07e-f54e3eb72b7b_50.6-MGP.jpg**		
Distance (ft):	**50.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

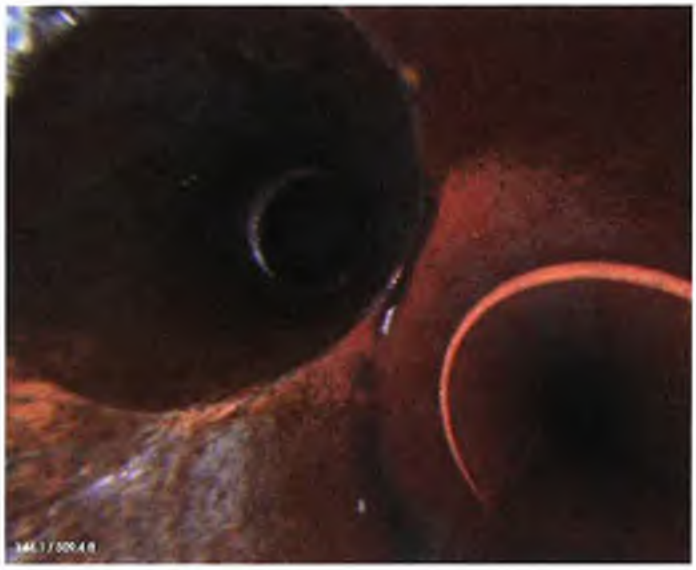
PACP Code:	**FC**		
Description:	**Fracture Circumferential**		
Image Name:	**7e21acfb-b53a-437e-bd6d-66574ac5c2ba_69.9-FC.jpg**		
Distance (ft):	**69.9**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**4**	Clock To:	**9**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	f3fdcf51-9e2f-4daa-89da-24fd5eda58a6_82.3-TF.jpg		
Distance (ft):	82.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	2d37f58c-81fa-4ec9-b4dd-c5aa9181e1d3_100.2-MGP.jpg		
Distance (ft):	100.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	Tap Factory		
Image Name:	8dc15929-2a2d-4b07-a71a-7ff18b16f607_105.4-TF.jpg		
Distance (ft):	105.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**b45cefa1-136b-4c85-936b-8d1b192e4b45_144.1-TF.jpg**		
Distance (ft):	**144.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**a99425a8-b1d2-4d40-9098-f23ac616a75d_149.9-FM.jpg**		
Distance (ft):	**149.9**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**ffd43dfc-8fcd-480d-b6cb-ef4cb887c80b_150.5-MGP.jpg**		
Distance (ft):	**150.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

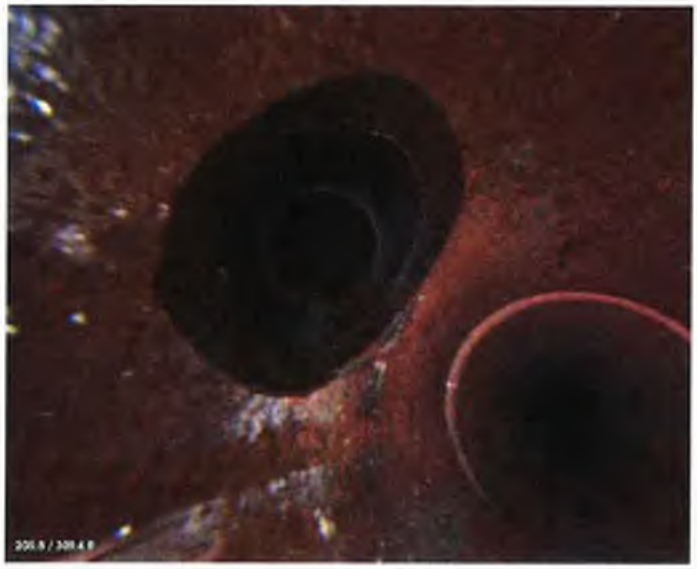
PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	ffb3eebc-8030-473f-94df-27bc01c7e7bd_155-FM.jpg		
Distance (ft):	155		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	8	Clock To:	4
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	561df07a-f24f-4b4d-a3c2-61101b181542_163.3-MWL.jpg		
Distance (ft):	163.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	8ec65f2f-5b9f-4ca8-afe8-8e90f27a3384_177.5-TF.jpg		
Distance (ft):	177.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

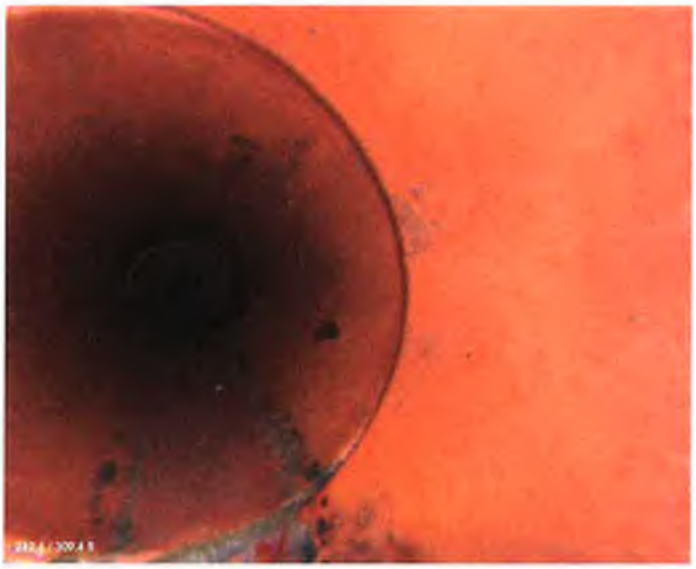
PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**4fd883a2-a8f9-49a7-a347-f01421f47804_188.9-FL.jpg**		
Distance (ft):	**188.9**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**6ed8c84b-7562-4fb1-b1c8-de8c59fbaf3b_200.2-MGP.jpg**		
Distance (ft):	**200.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**ac75613f-1ef0-4dc9-8053-1abc003d84f4_205.8-TF.jpg**		
Distance (ft):	**205.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**d4d12208-b125-4d72-856f-5cdc1a74ca0f_216.4-FM.jpg**		
Distance (ft):	**216.4**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



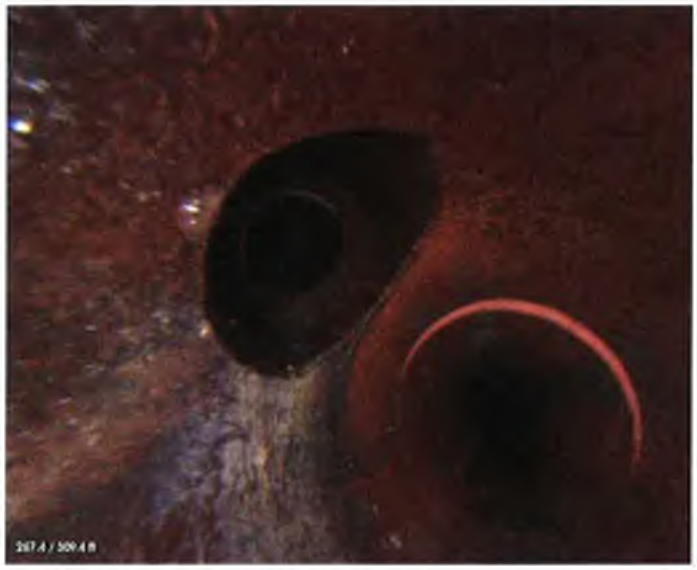
PACP Code:	CL		
Description:	**Crack Longitudinal**		
Image Name:	**4972867f-938a-4c06-bbaa-d98b5ca81ea8_242.4-CL.jpg**		
Distance (ft):	**242.4**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**c336a78d-4d1f-47f1-b689-5a0b12b1633d_244.2-TF.jpg**		
Distance (ft):	**244.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	CL		
Description:	Crack Longitudinal		
Image Name:	f71e872d-11c0-4f07-9b41-eaa22f34d4b8_250.3-CL.jpg		
Distance (ft):	250.3		
Structural Grade:	2	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	ef011897-a415-4b57-98d1-a1e4257fa46b_250.3-MGP.jpg		
Distance (ft):	250.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	2baa6527-370e-4dce-bf1a-288e3ee598c3_254.9-FM.jpg		
Distance (ft):	254.9		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	6	Clock To:	6
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



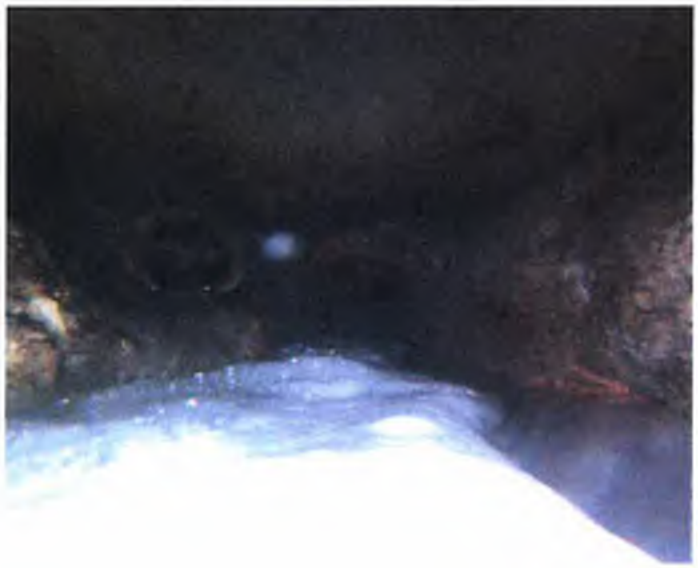
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	b40629a9-fee4-435a-9024-814cdbcc0771_267.4-TF.jpg		
Distance (ft):	267.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	aee19ad2-6319-4153-b528-105798a01d27_294.6-MWL.jpg		
Distance (ft):	294.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	20		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	8053c616-d173-49c8-8506-82fc815329d6_299-FM.jpg		
Distance (ft):	299		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	3
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**d63f84cd-94ac-4d89-8f99-0edab6202ddd_300.2-MGP.jpg**		
Distance (ft):	**300.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**fd09a68a-9630-423b-8853-45cb42efff9f_300.2-MWL.jpg**		
Distance (ft):	**300.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**40**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**6622f786-823d-430f-860f-8642e240741f_309.4-AMH.jpg**		
Distance (ft):	**309.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1015 to 07-1014	07-1015	07-1014	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		85	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

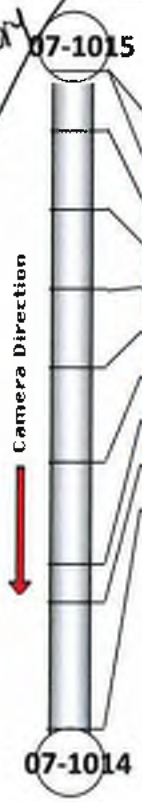
Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	11:46 AM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		85
Media Label	Reverse Setup	Work Order No	Additional Info	
NS15-1530	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
21	21	0
Overall Index	Structural Index	Maintenance Index
3.5	3.5	0
Overall Quick	Structural Quick	Maintenance Quick
4333	4333	0000

Joint every 5 ft

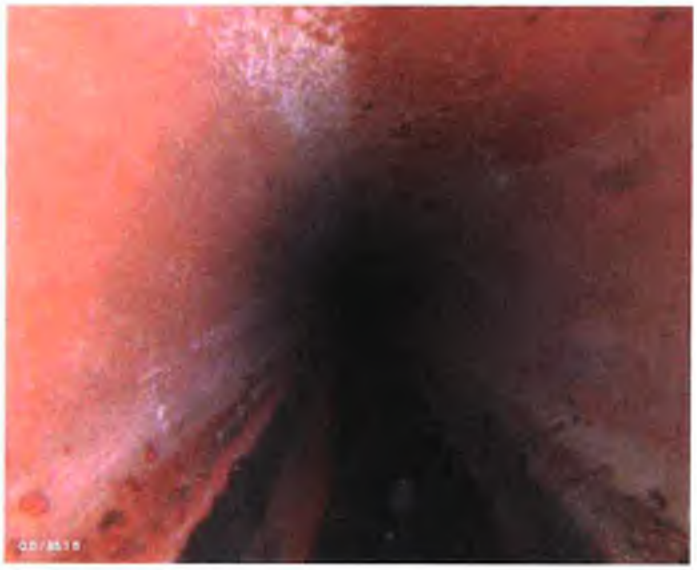


Grade	Dist (ft)	Observation		
-	0	[AMH] Manhole Remarks: Begin survey		
-	0	[MWL] Water Level 5% of cross sectional area (5%)		
3	3	JOM Joint Offset Medium	J3 - 6,	
3	7.8	[FL] Fracture Longitudinal at 11 o'clock within 8" of joint	J8 - 13	15 ft
4	17.9	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint	J18 - 23	
4	28	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint	J28 - 33	15 ft
3	38.2	[CM] Crack Multiple from 10 to 11 o'clock within 8" of joint	J38 - 43	
-	50.5	[MGP] General Photo		
3	63.6	[CM] Crack Multiple from 11 to 1 o'clock within 8" of joint	J64 - 69	10
4	68.7	[FM] Fracture Multiple from 12 to 1 o'clock within 8" of joint	J69 - 74	
-	85.1	[AMH] Manhole Remarks: End of survey		

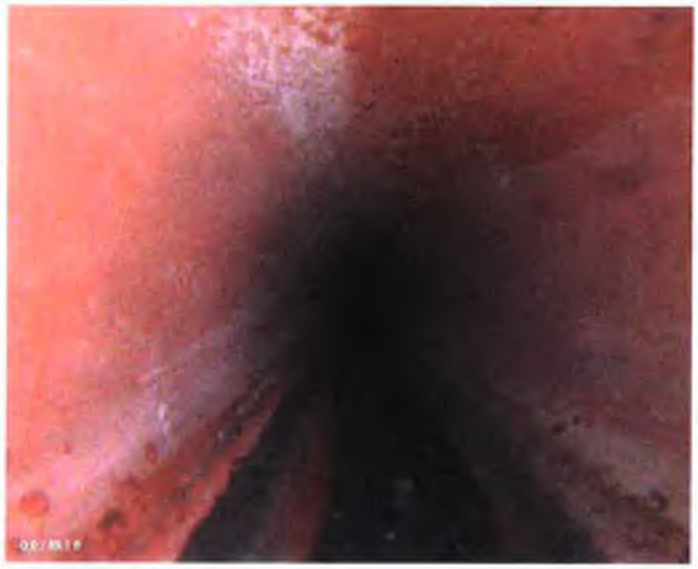
Recommendation

Condition Observations:

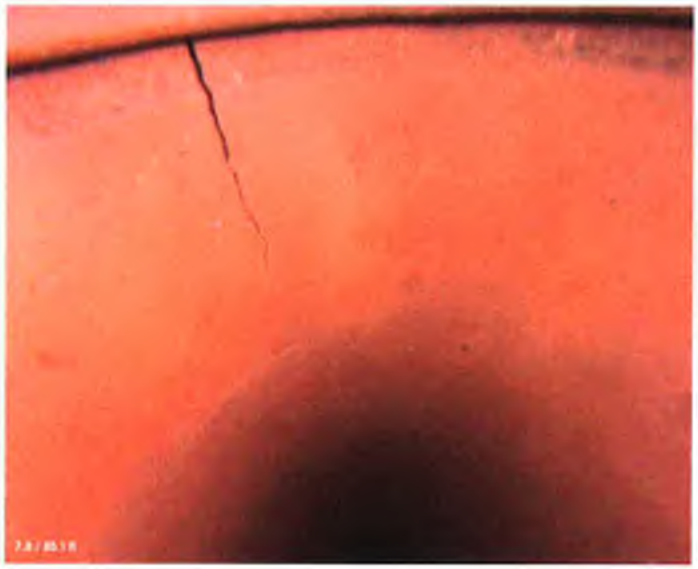
Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	5% of cross sectional area				5	☐		
3	7.8	FL	Fracture Longitudinal	at 11 o'clock within 8" of joint					☑	11	
4	17.9	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint					☑	10	2
4	28	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint					☑	10	2
3	38.2	CM	Crack Multiple	from 10 to 11 o'clock within 8" of joint					☑	10	11
-	50.5	MGP	General Photo						☐		
3	63.6	CM	Crack Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
4	68.7	FM	Fracture Multiple	from 12 to 1 o'clock within 8" of joint					☑	12	1
-	85.1	AMH	Manhole	Remarks: End of survey					☐		



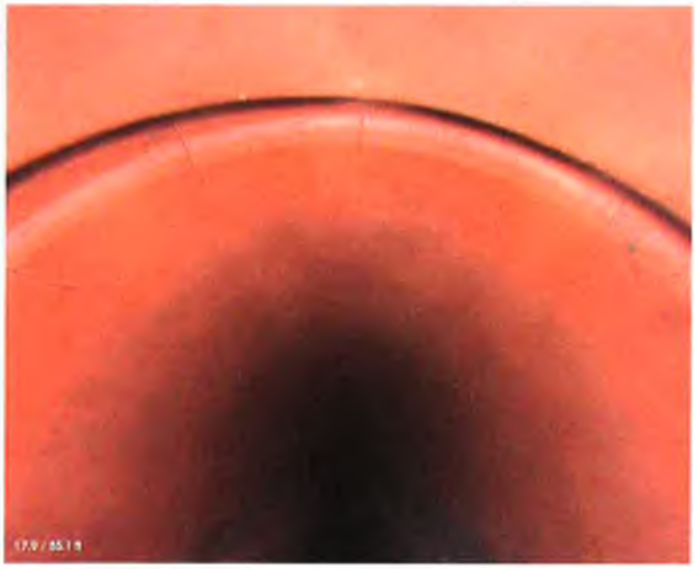
PACP Code:	AMH		
Description:	Manhole		
Image Name:	fc7f5dfb-52e5-49cd-a76e-811c3149e693_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		



PACP Code:	MWL		
Description:	Water Level		
Image Name:	e2070d7a-3d72-456b-83be-0fae21a200dd_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**c78528b2-434b-4735-9ca8-91661f475e4f_7.8-FL.jpg**		
Distance (ft):	**7.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**07089ca4-6fac-4aa2-a31f-34062dcf52f3_17.9-FM.jpg**		
Distance (ft):	**17.9**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

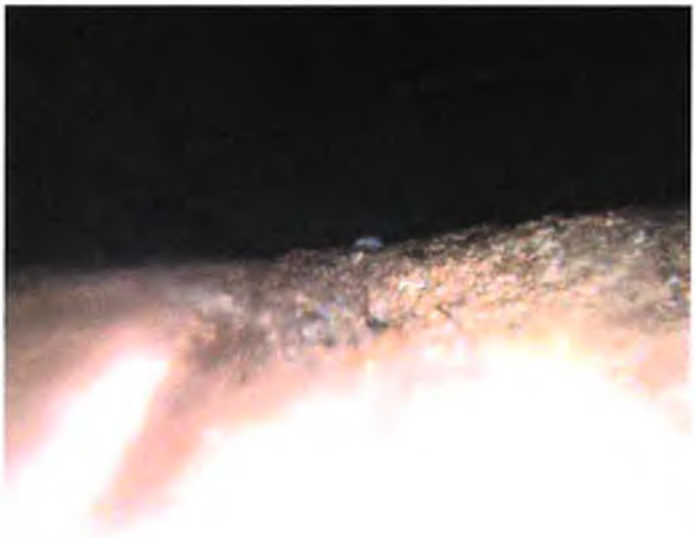
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**cc50c869-b514-4fd3-bc77-e4f11905f2ec_28-FM.jpg**		
Distance (ft):	**28**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	CM		
Description:	**Crack Multiple**		
Image Name:	**c3b84009-4684-4568-afd9-174da6d2ab60_38.2-CM.jpg**		
Distance (ft):	**38.2**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**11**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**c349ae68-b876-4c08-bba3-8817fa4c3ed3_50.5-MGP.jpg**		
Distance (ft):	**50.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**74f0b07e-f3d6-4c0c-b637-0db730072c80_63.6-CM.jpg**		
Distance (ft):	**63.6**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**7ed5d216-a6f9-4c51-95dc-74ac853c35a7_68.7-FM.jpg**		
Distance (ft):	**68.7**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**57242ba6-6523-471f-ab9f-2e1a4ae848db_85.1-AMH.jpg**		
Distance (ft):	**85.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1024 to 07-1023	07-1024	07-1023	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		0	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	01:23 PM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		241
Media Label	Reverse Setup	Work Order No	Additional Info	
NS19-1450	NO	-		

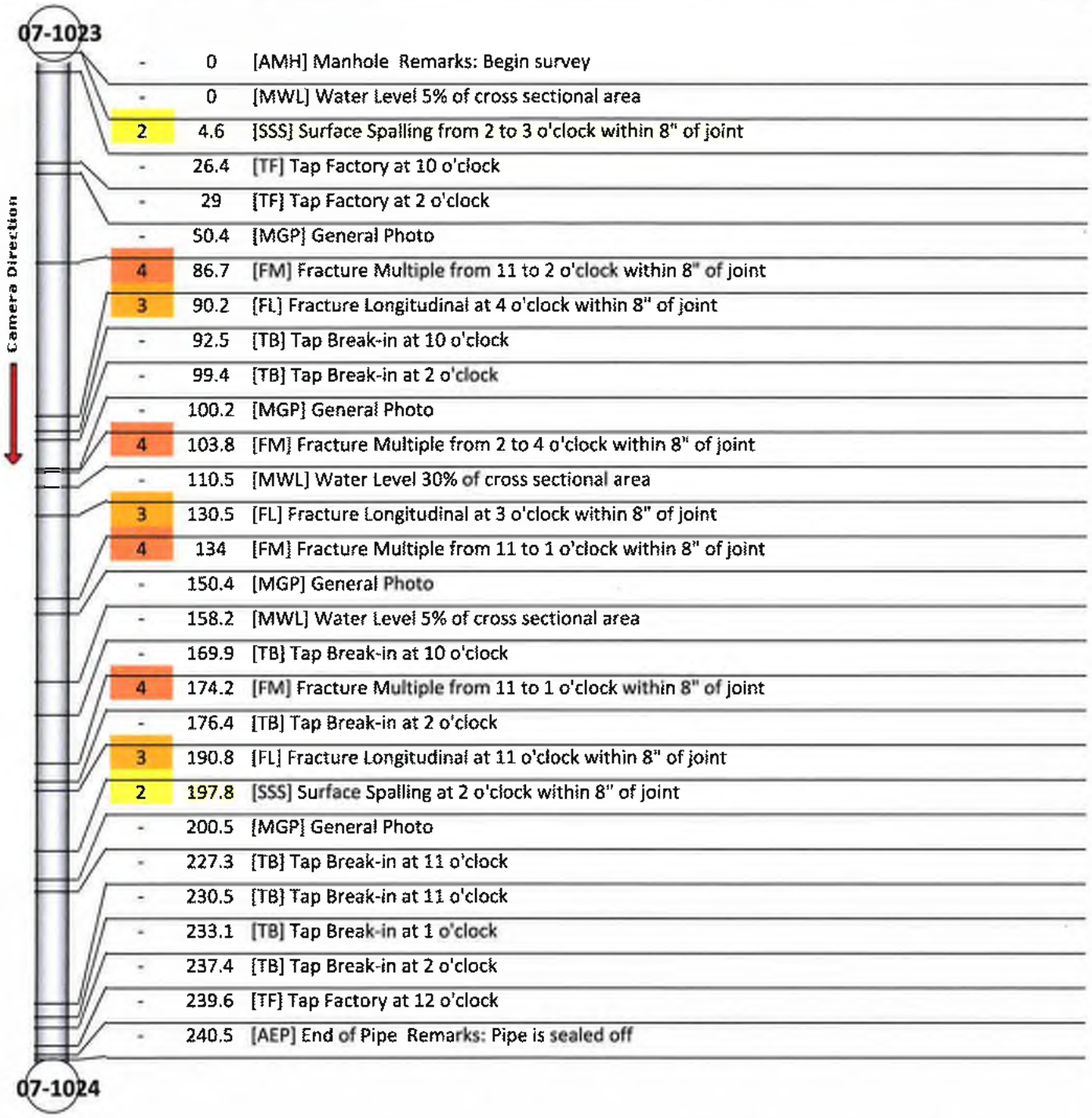
Results:

Overall Rating	Structural Rating	Maintenance Rating
29	29	0
Overall Index	Structural Index	Maintenance Index
3.22	3.22	0
Overall Quick	Structural Quick	Maintenance Quick
4433	4433	0000

- no video on file, only REPORT
- seen water level issues in report

Recommendation

① Open Trench Pipe Replacement



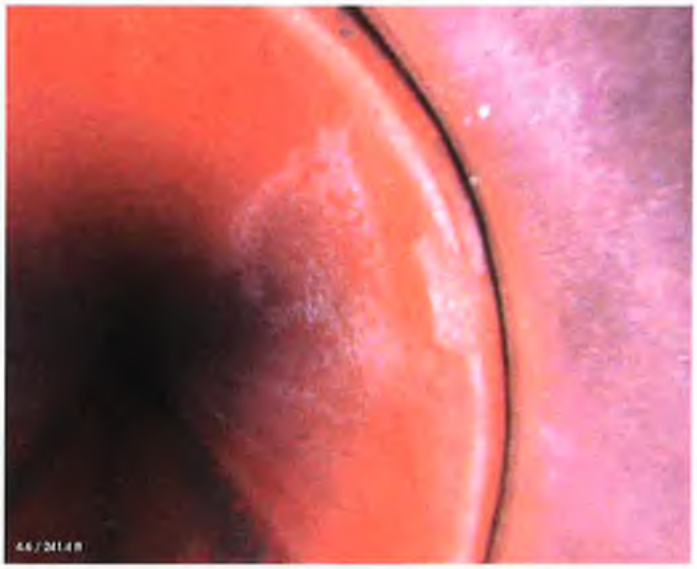
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values			8" of Joint	Clock	
						1st	2nd	%		From	To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	5% of cross sectional area				5	☐		
2	4.6	SSS	Surface Spalling	from 2 to 3 o'clock within 8" of joint					☑	2	3
-	26.4	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	29	TF	Tap Factory	at 2 o'clock		4			☐	2	

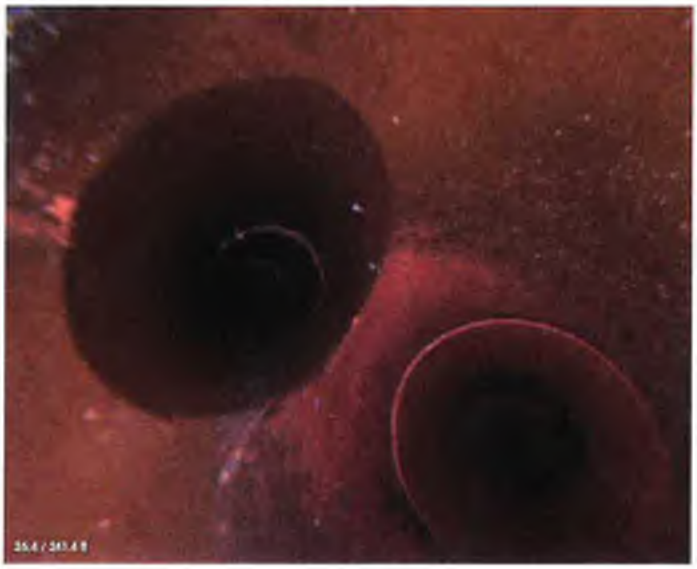
-	50.4	MGP	General Photo						☐		
4	86.7	FM	Fracture Multiple	from 11 to 2 o'clock within 8" of joint					☑	11	2
3	90.2	FL	Fracture Longitudinal	at 4 o'clock within 8" of joint					☑	4	
-	92.5	TB	Tap Break-in	at 10 o'clock		4			☐	10	
-	99.4	TB	Tap Break-in	at 2 o'clock		4			☐	2	
-	100.2	MGP	General Photo						☐		
4	103.8	FM	Fracture Multiple	from 2 to 4 o'clock within 8" of joint					☑	2	4
-	110.5	MWL	Water Level	30% of cross sectional area				30	☐		
3	130.5	FL	Fracture Longitudinal	at 3 o'clock within 8" of joint					☑	3	
4	134	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	150.4	MGP	General Photo						☐		
-	158.2	MWL	Water Level	5% of cross sectional area				5	☐		
-	169.9	TB	Tap Break-in	at 10 o'clock		4			☐	10	
4	174.2	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	176.4	TB	Tap Break-in	at 2 o'clock		4			☐	2	
3	190.8	FL	Fracture Longitudinal	at 11 o'clock within 8" of joint					☑	11	
2	197.8	SSS	Surface Spalling	at 2 o'clock within 8" of joint					☑	2	
-	200.5	MGP	General Photo						☐		
-	227.3	TB	Tap Break-in	at 11 o'clock		4			☐	11	
-	230.5	TB	Tap Break-in	at 11 o'clock		4			☐	11	
-	233.1	TB	Tap Break-in	at 1 o'clock		4			☐	1	
-	237.4	TB	Tap Break-in	at 2 o'clock		4			☐	2	
-	239.6	TF	Tap Factory	at 12 o'clock		4			☐	12	
-	240.5	AEP	End of Pipe	Remarks: Pipe is sealed off					☐		

PACP Code:	AMH		
Description:	Manhole		
Image Name:	19c8f534-d168-472e-b398-1edef46dcb19_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

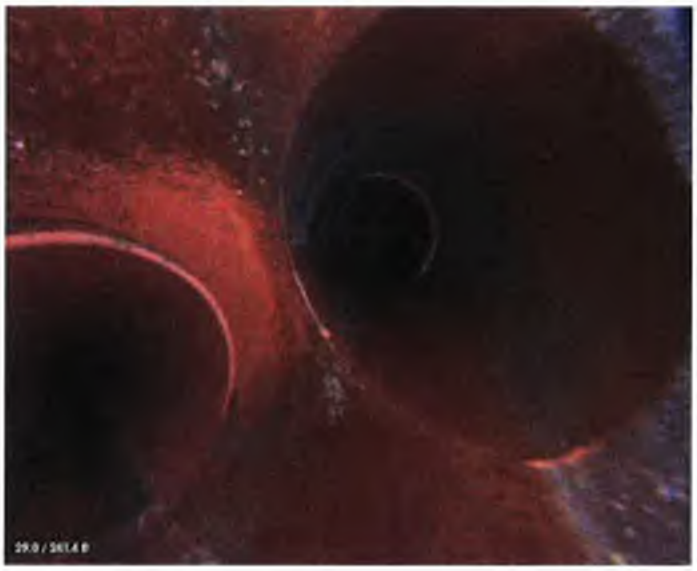
PACP Code:	MWL		
Description:	Water Level		
Image Name:	6193bd59-721e-41aa-8184-2574e7f4fec6_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	SSS		
Description:	Surface Spalling		
Image Name:	e9b94d9f-61b3-4967-b8cb-f705f57c081d_4.6-SSS.jpg		
Distance (ft):	4.6		
Structural Grade:	2	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	3
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

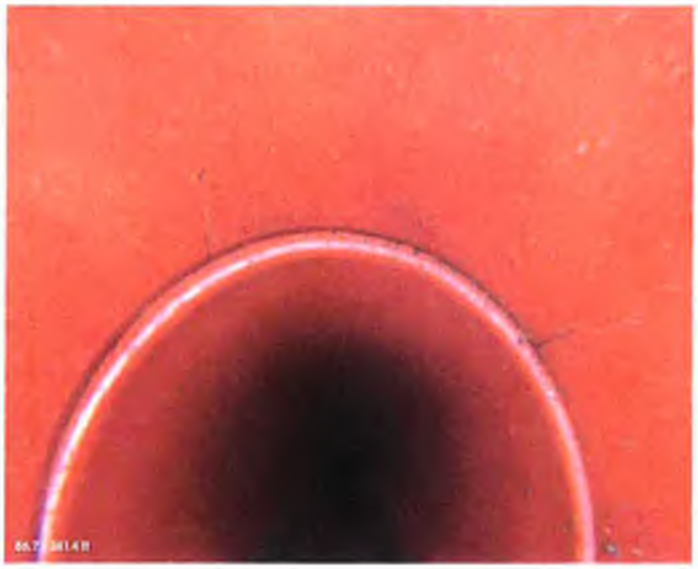


PACP Code:	TF		
Description:	Tap Factory		
Image Name:	ee813ec0-19f0-4e23-957c-97185a0396e4_26.4-TF.jpg		
Distance (ft):	26.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

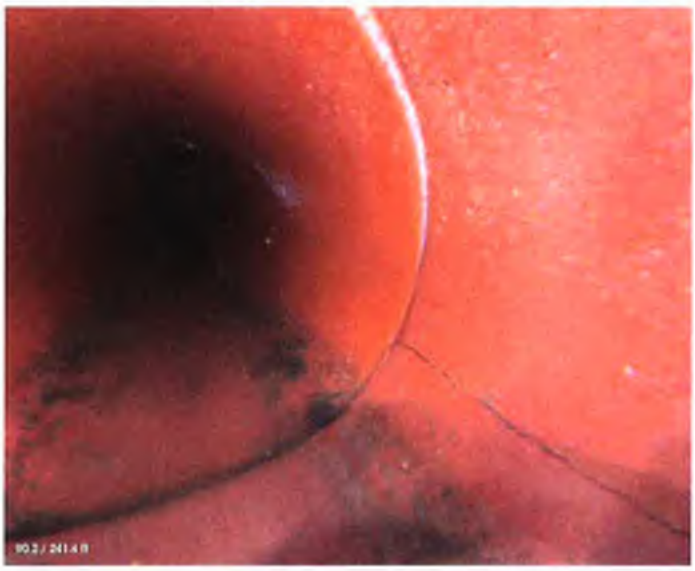


PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**8f3c8b51-62bc-4781-ac0d-e2c617068e76_29-TF.jpg**		
Distance (ft):	**29**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

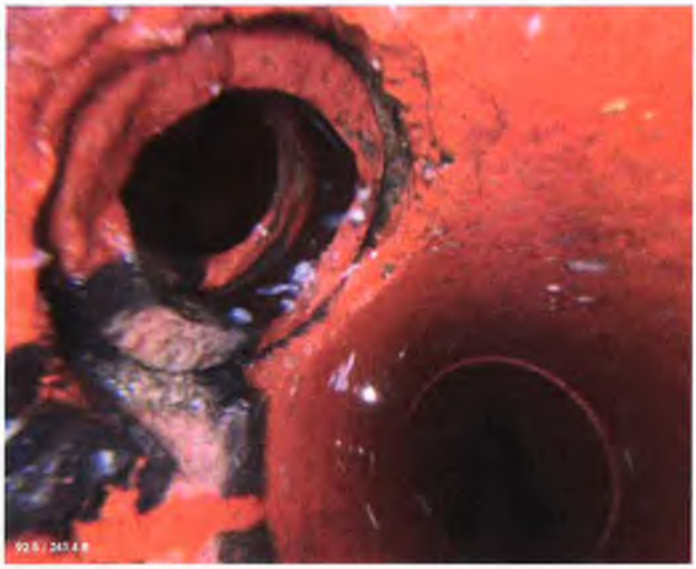
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**247a54e0-785b-4a71-ae37-4e1f3f144938_50.4-MGP.jpg**		
Distance (ft):	**50.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



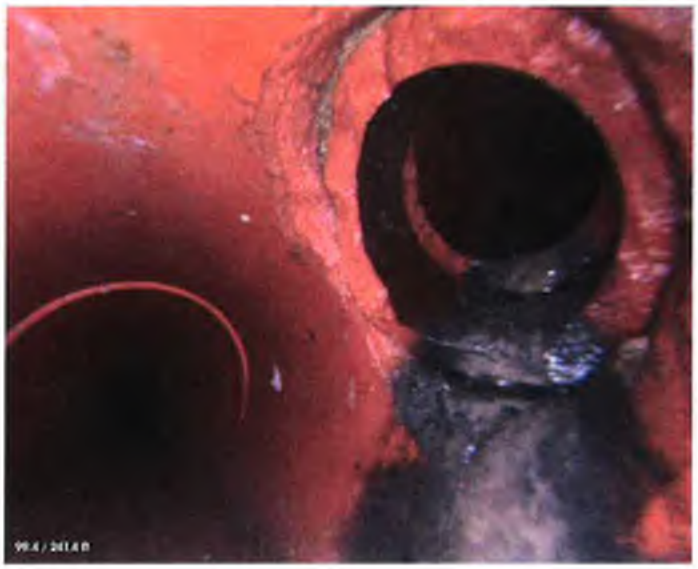
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**a9e88842-c9ad-44e0-b93f-3bef945a583a_86.7-FM.jpg**		
Distance (ft):	**86.7**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



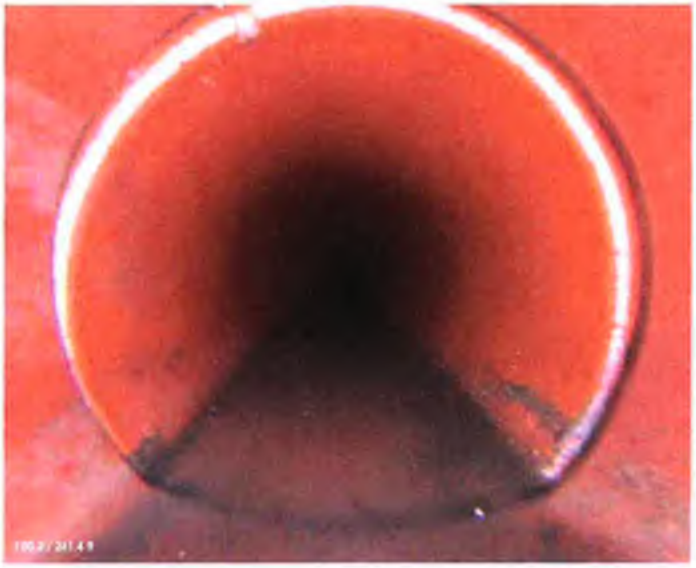
PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	ffc88cf1-954c-4178-bd02-0127d4356dd7_90.2-FL.jpg		
Distance (ft):	90.2		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	4	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



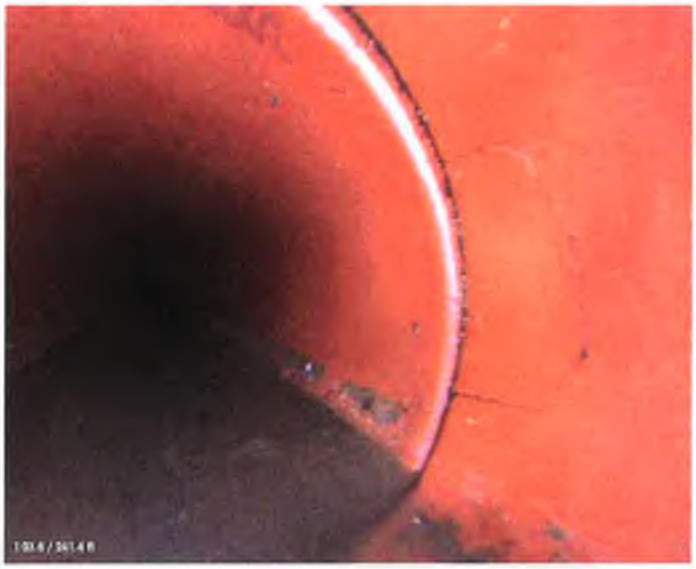
PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	c5f220c3-b897-45a4-9e50-e242ed8df68a_92.5-TB.jpg		
Distance (ft):	92.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	0b426a70-f51a-4874-ba1e-305ee8d37214_99.4-TB.jpg		
Distance (ft):	99.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

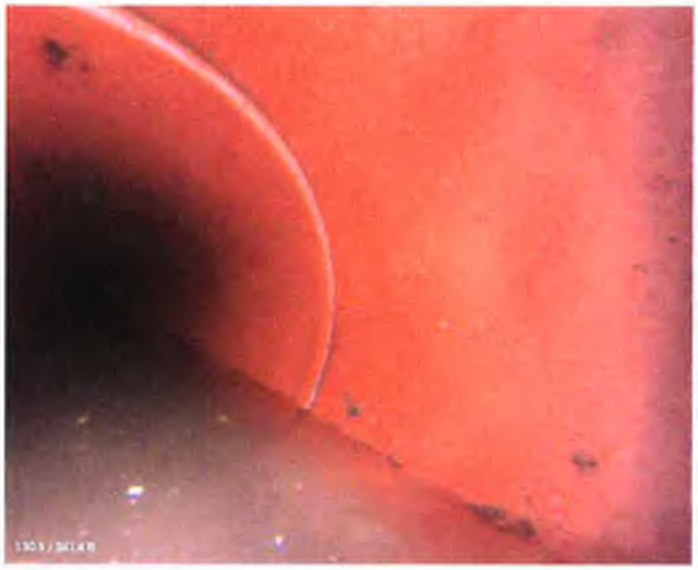


PACP Code:	MGP		
Description:	General Photo		
Image Name:	c279f307-0cdb-4e5e-9a36-0588444659a2_100.2-MGP.jpg		
Distance (ft):	100.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	6dc0fd58-80d6-4eb7-8171-ebddaf302c3f_103.8-FM.jpg		
Distance (ft):	103.8		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	4
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	635500e3-b791-4ce1-9249-e189b6bcef98_110.5-MWL.jpg		
Distance (ft):	110.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	30		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**08ad139d-542d-4c29-8c69-4b8d7dc7fe1e_130.5-FL.jpg**		
Distance (ft):	**130.5**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**b9c9a669-0c2e-45ed-8216-fda7002b43f9_134-FM.jpg**		
Distance (ft):	**134**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**260860fa-6ea6-41bc-ba71-dc061b0c7433_150.4-MGP.jpg**		
Distance (ft):	**150.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

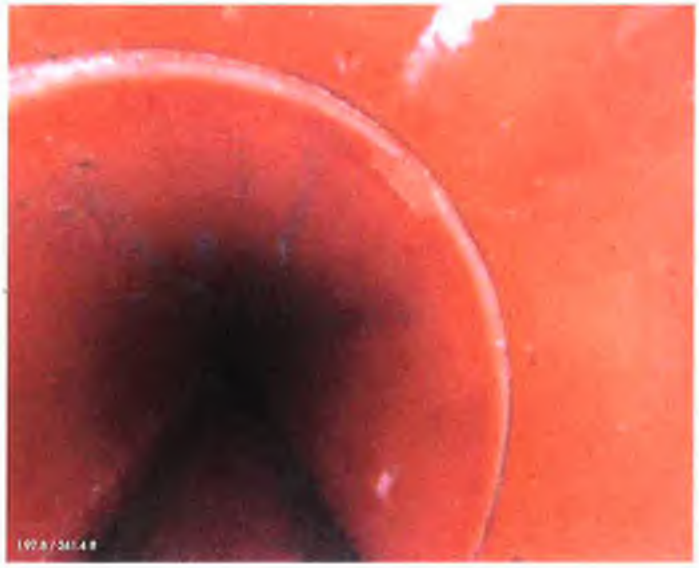
PACP Code:	MWL		
Description:	**Water Level**		
Image Name:	**6470c44e-374d-4954-aa01-3a841922a455_158.2-MWL.jpg**		
Distance (ft):	**158.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**5**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TB		
Description:	**Tap Break-in**		
Image Name:	**023ba608-5f8d-4e05-bae7-55ea796f10d1_169.9-TB.jpg**		
Distance (ft):	**169.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**c430a0c6-944e-4832-9c13-f237fc2ebf6a_174.2-FM.jpg**		
Distance (ft):	**174.2**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

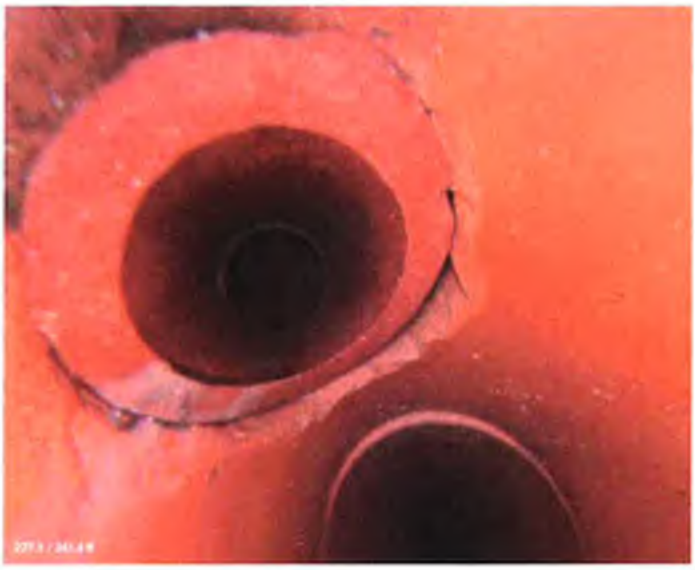
PACP Code:	TB		
Description:	**Tap Break-in**		
Image Name:	**1e71d58a-04cc-4fa3-91b1-eefedd73a8c2_176.4-TB.jpg**		
Distance (ft):	**176.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**24ea277f-f96f-447a-b3e7-c0ec8c1c731a_190.8-FL.jpg**		
Distance (ft):	**190.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

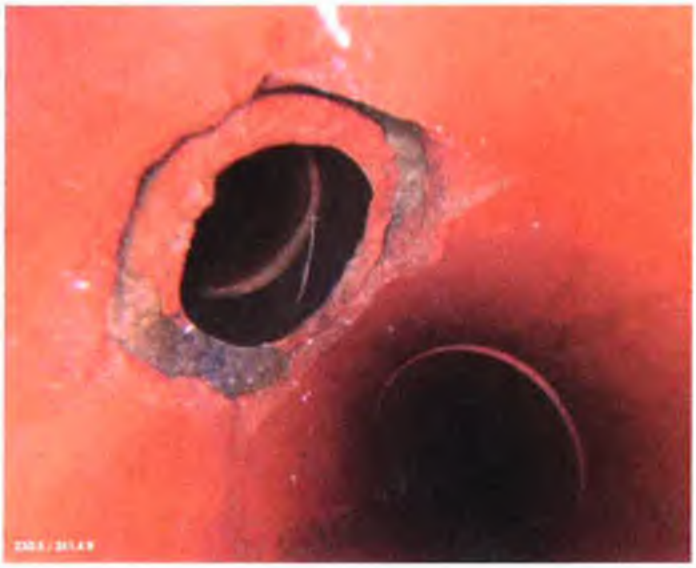


PACP Code:	SSS		
Description:	**Surface Spalling**		
Image Name:	**ef43b19e-ec76-4c33-b26a-e87a372c0faf_197.8-SSS.jpg**		
Distance (ft):	**197.8**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

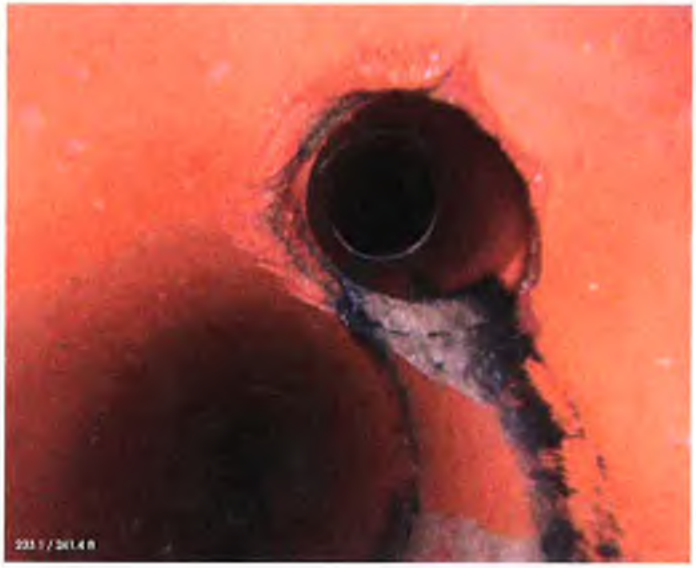
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**00f1f74a-549d-4ba5-8269-090f424aac7a_200.5-MGP.jpg**		
Distance (ft):	**200.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**TB**		
Description:	**Tap Break-in**		
Image Name:	**795df043-b491-41e7-9ccf-989de80f84a3_227.3-TB.jpg**		
Distance (ft):	**227.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**TB**		
Description:	**Tap Break-in**		
Image Name:	**900ced31-e2de-4e27-b7d9-64aaeaba7bbe_230.5-TB.jpg**		
Distance (ft):	**230.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	6920c31c-5ca3-4cf3-a351-e47134f4a9e9_233.1-TB.jpg		
Distance (ft):	233.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	a9cead83-4da2-4d88-ab14-b9e400f54e39_237.4-TB.jpg		
Distance (ft):	237.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	b2676f19-0798-4b41-b4b5-58950a4051ea_239.6-TF.jpg		
Distance (ft):	239.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AEP**		
Description:	**End of Pipe**		
Image Name:	**669c8076-8b2c-410f-91b0-da686acdb33b_240.5-AEP.jpg**		
Distance (ft):	**240.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Pipe is sealed off**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1012 to 07-1013	07-1012	07-1013	Not Known	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		279	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	11:36 AM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		279
Media Label	Reverse Setup	Work Order No	Additional Info	
NS6-1465	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
27	27	0
Overall Index	Structural Index	Maintenance Index
3.38	3.38	0
Overall Quick	Structural Quick	Maintenance Quick
4335	4335	0000

- scattered joint cracks and fractures across the whole pipe
- material was in good shape and no sags

Recommendation

① CIPP Entire length of pipe (279)

Grade	Dist (ft)	Observation	
		07-1013	
-	0	[AMH] Manhole Remarks: Begin survey	
-	0	[MWL] Water Level 10% of cross sectional area	
-	2.6	[TBA] Tap Break-in Active at 2 o'clock	
-	21.6	[TFC] Tap Factory Capped at 2 o'clock	
-	27.5	[TFC] Tap Factory Capped at 10 o'clock	
-	50.2	[MGP] General Photo	
-	69.8	[TF] Tap Factory at 2 o'clock	
-	75.7	[TF] Tap Factory at 10 o'clock	
-	86.1	[MWL] Water Level 40% of cross sectional area	
-	100.4	[MGP] General Photo	
4	103	[FM] Fracture Multiple from 12 to 4 o'clock within 8" of joint	@ Joint 103
3	109.7	[FL] Fracture Longitudinal at 11 o'clock within 8" of joint	@ Joint 110
-	121.3	[TFC] Tap Factory Capped at 2 o'clock	
-	127.3	[TF] Tap Factory at 10 o'clock	
-	134.2	[TB] Tap Break-in at 3 o'clock	
4	141.2	[FM] Fracture Multiple from 12 to 2 o'clock within 8" of joint	
-	142.3	[TB] Tap Break-in at 2 o'clock	
-	150.4	[MGP] General Photo	
-	172.9	[TFC] Tap Factory Capped at 2 o'clock	
-	178.7	[TFC] Tap Factory Capped at 10 o'clock	
-	188.6	[MWL] Water Level 10% of cross sectional area	
-	200.1	[MGP] General Photo	
-	201.6	[TB] Tap Break-in at 10 o'clock	
-	207	[TB] Tap Break-in at 2 o'clock	
-	217.9	[TFC] Tap Factory Capped at 2 o'clock	
-	223.6	[TFC] Tap Factory Capped at 10 o'clock	
3	234.4	[FL] Fracture Longitudinal at 10 o'clock within 8" of joint	Joint 235
3	244.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J 245
3	250.8	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J251
-	250.8	[MGP] General Photo	
4	261.1	[FM] Fracture Multiple from 1 to 2 o'clock within 8" of joint	J261
3	267.6	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint	J268
-	279.1	[AMH] Manhole Remarks: End of survey	
		07-1012	

Camera Direction

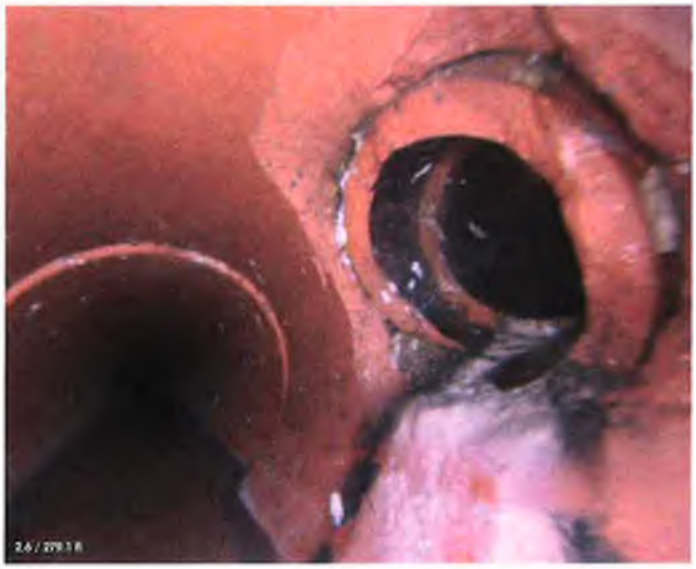
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	10% of cross sectional area				10	☐		

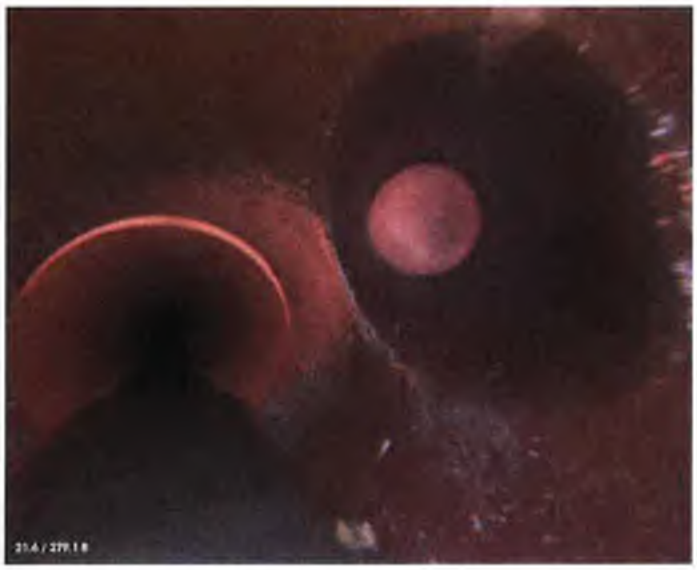
-	2.6	TBA	Tap Break-in Active	at 2 o'clock		4			☐	2	
-	21.6	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	27.5	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	50.2	MGP	General Photo						☐		
-	69.8	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	75.7	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	86.1	MWL	Water Level	40% of cross sectional area				40	☐		
-	100.4	MGP	General Photo						☐		
4	103	FM	Fracture Multiple	from 12 to 4 o'clock within 8" of joint					☑	12	4
3	109.7	FL	Fracture Longitudinal	at 11 o'clock within 8" of joint					☑	11	
-	121.3	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	127.3	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	134.2	TB	Tap Break-in	at 3 o'clock		4			☐	3	
4	141.2	FM	Fracture Multiple	from 12 to 2 o'clock within 8" of joint					☑	12	2
-	142.3	TB	Tap Break-in	at 2 o'clock		4			☐	2	
-	150.4	MGP	General Photo						☐		
-	172.9	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	178.7	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	188.6	MWL	Water Level	10% of cross sectional area				10	☐		
-	200.1	MGP	General Photo						☐		
-	201.6	TB	Tap Break-in	at 10 o'clock		4			☐	10	
-	207	TB	Tap Break-in	at 2 o'clock		4			☐	2	
-	217.9	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	223.6	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
3	234.4	FL	Fracture Longitudinal	at 10 o'clock within 8" of joint					☑	10	
3	244.4	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	250.8	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	250.8	MGP	General Photo						☐		
4	261.1	FM	Fracture Multiple	from 1 to 2 o'clock within 8" of joint					☑	1	2
3	267.6	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
-	279.1	AMH	Manhole	Remarks: End of survey					☐		

PACP Code:	AMH		
Description:	Manhole		
Image Name:	5199caa7-9ebc-419e-a2a0-7dbc5407b550_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

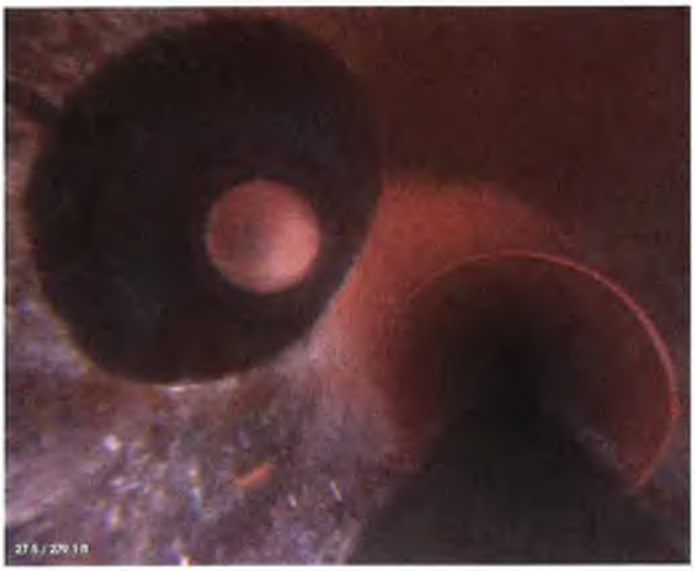
PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**bdeadcd6-d6d2-4dd7-a850-8def92b55047_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**10**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**TBA**		
Description:	**Tap Break-in Active**		
Image Name:	**1b2b8e25-9b43-4db7-9658-b4281909b23c_2.6-TBA.jpg**		
Distance (ft):	**2.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

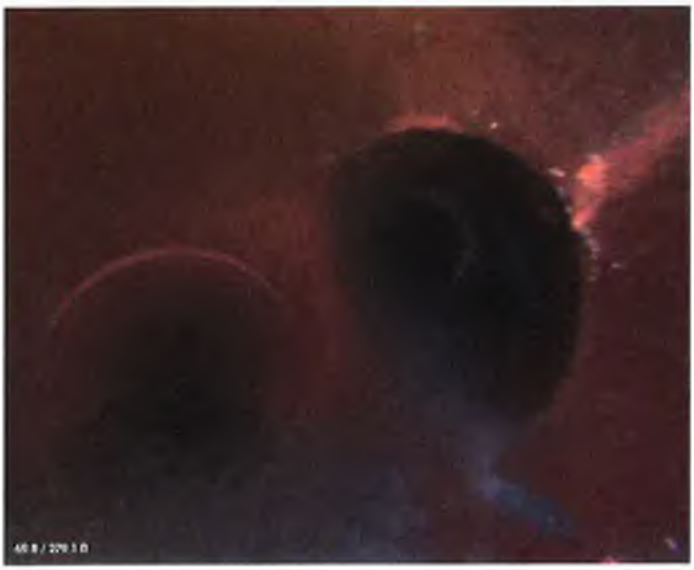


PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**55c12211-e7d3-41ee-9843-664135b74397_21.6-TFC.jpg**		
Distance (ft):	**21.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

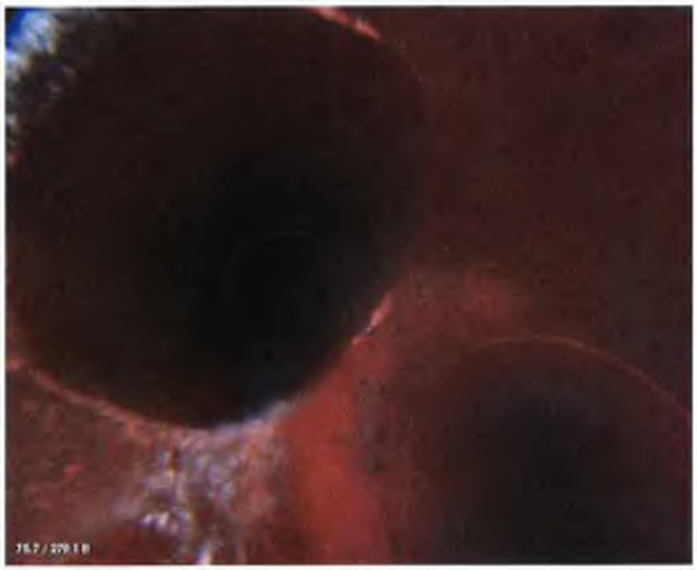


PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**e9eb525a-6e1a-47f7-991c-83ecf8202c12_27.5-TFC.jpg**		
Distance (ft):	**27.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**c50c5daa-a23d-4caa-927e-c12aa51fb8eb_50.2-MGP.jpg**		
Distance (ft):	**50.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**d5e23e66-af07-4a6b-a115-12fcf7f5124f_69.8-TF.jpg**		
Distance (ft):	**69.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**37e68413-7d22-4512-83c7-2baec62f01b6_75.7-TF.jpg**		
Distance (ft):	**75.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

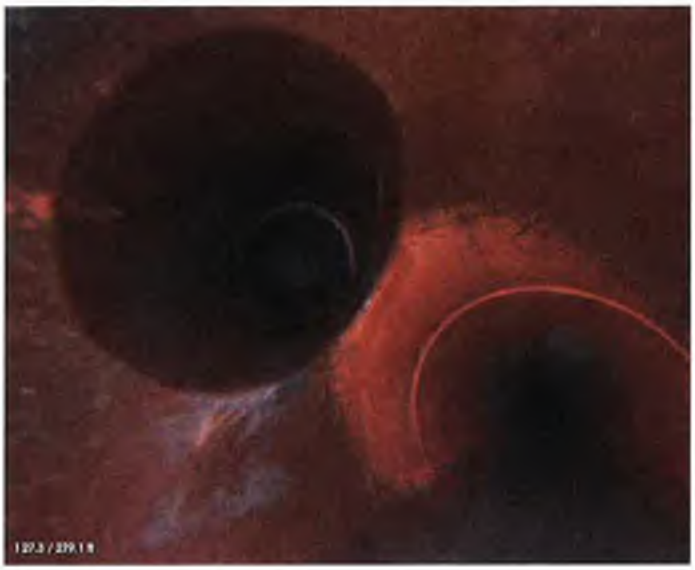
PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**cac18d25-c2ec-4a82-832c-422aea7bc92e_86.1-MWL.jpg**		
Distance (ft):	**86.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**40**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**9d761c4f-c618-4076-8640-f8aea86f8c4e_100.4-MGP.jpg**		
Distance (ft):	**100.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

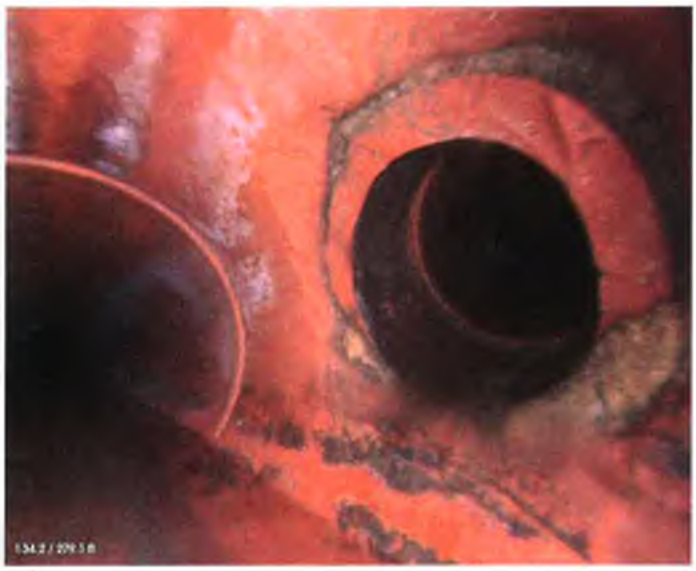
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**fcd769ff-4b5b-4be4-a983-ce7b69f28963_103-FM.jpg**		
Distance (ft):	**103**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**4da343b4-3ab5-4e6b-b2ab-b5dcd64730a0_109.7-FL.jpg**		
Distance (ft):	**109.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

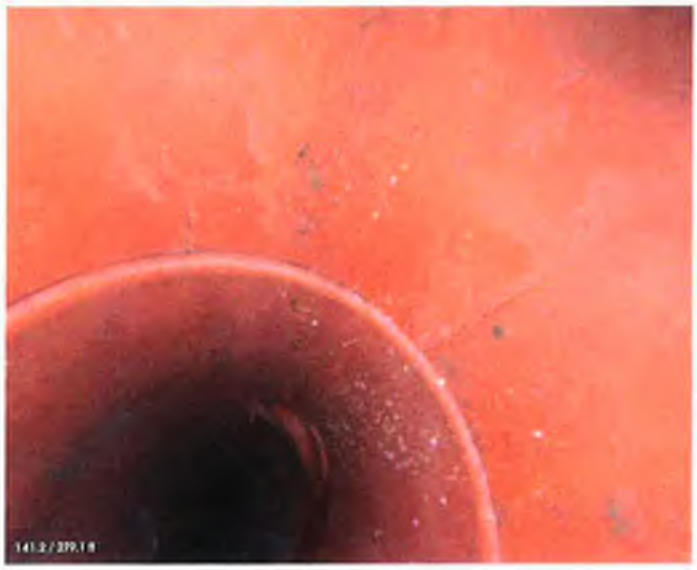
PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**517407f3-85c7-4a17-be6c-60f5ea7a822d_121.3-TFC.jpg**		
Distance (ft):	**121.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**4343a1a5-b11d-4fce-a9e2-7efc4fe1d5ea_127.3-TF.jpg**		
Distance (ft):	**127.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



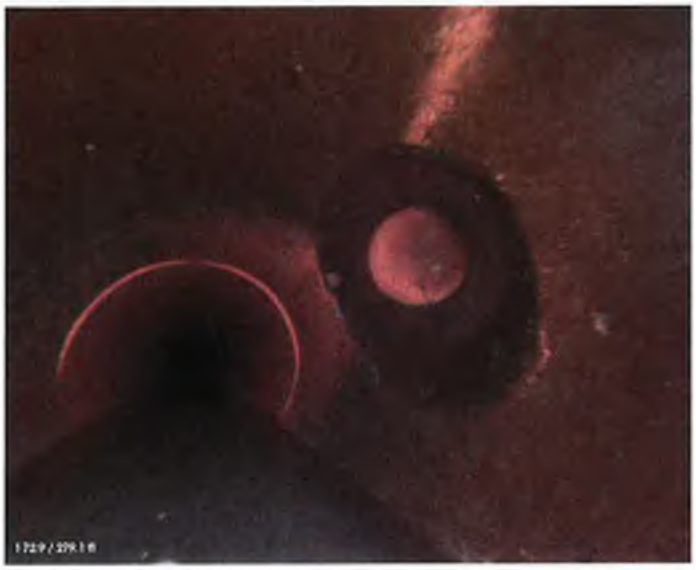
PACP Code:	TB		
Description:	**Tap Break-in**		
Image Name:	**9bd03194-9174-4f66-a732-f26ea71af3e8_134.2-TB.jpg**		
Distance (ft):	**134.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



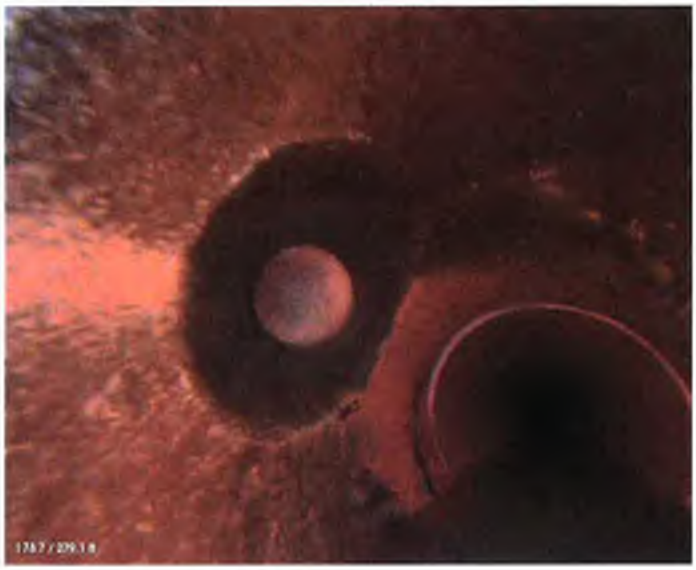
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**9e939f3e-52bb-4d5f-b7cf-d13b43f60a4f_141.2-FM.jpg**		
Distance (ft):	**141.2**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**TB**		
Description:	**Tap Break-in**		
Image Name:	**03f1846c-e3e2-499f-918d-dfa7298fb46a_142.3-TB.jpg**		
Distance (ft):	**142.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**63ec79ff-6cb4-4b76-9f7c-1332f91212a4_150.4-MGP.jpg**		
Distance (ft):	**150.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**697fc6fe-4783-4fa2-989c-0c3c499bf67f_172.9-TFC.jpg**		
Distance (ft):	**172.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



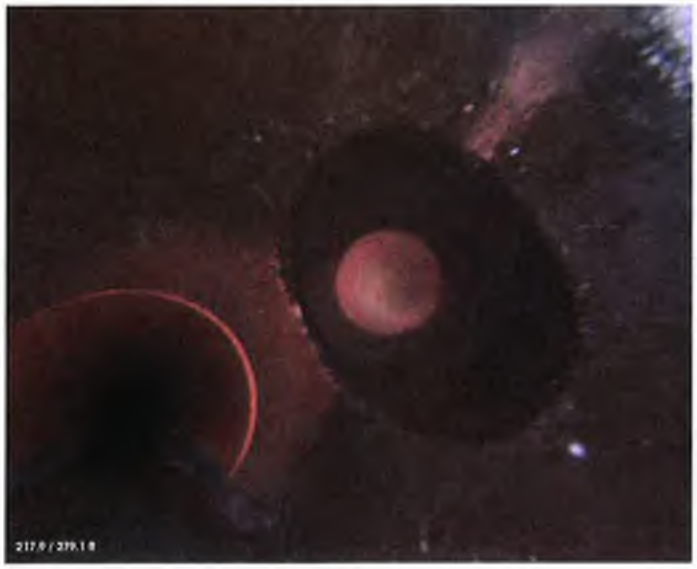
PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**bb6e7383-8904-455f-a525-9e7e64088526_178.7-TFC.jpg**		
Distance (ft):	**178.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**14dffcec-cacc-4da6-9ddd-be59928dd9e3_188.6-MWL.jpg**		
Distance (ft):	**188.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**10**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

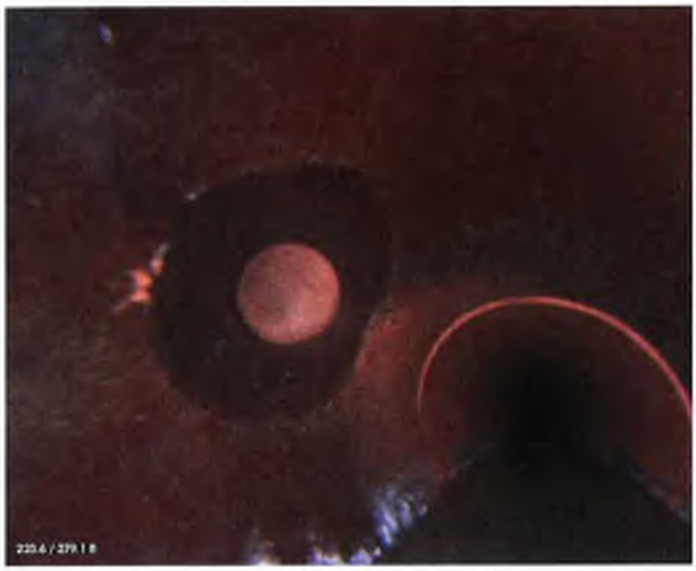
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**ee2c95f1-b9a6-4a0a-9fbb-bee76380dd18_200.1-MGP.jpg**		
Distance (ft):	**200.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	2aa2ddba-3cc1-4e39-a7b4-7f4c0df7b7dc_201.6-TB.jpg		
Distance (ft):	201.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	1c9d2b30-7f4d-482a-964e-fb280e136a9c_207-TB.jpg		
Distance (ft):	207		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



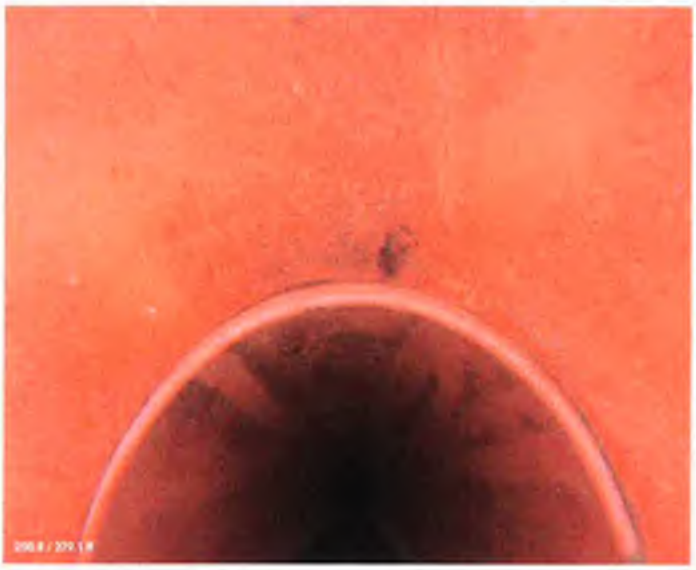
PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	1f5408f6-2a18-4407-8844-d3d599e1dc7c_217.9-TFC.jpg		
Distance (ft):	217.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	85fdedeb-e3f1-463f-a9d2-497d97d42cd6_223.6-TFC.jpg		
Distance (ft):	223.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	8bb1d037-46f9-4f43-a995-5efcba79849d_234.4-FL.jpg		
Distance (ft):	234.4		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	647fa939-c574-4be1-aab4-7c14c36ca1c0_244.4-FL.jpg		
Distance (ft):	244.4		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**53cc5e3c-194b-4ab5-9d1b-0de1b8859dd6_250.8-FL.jpg**		
Distance (ft):	**250.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**75b0428f-4e5b-4de2-8556-aaaf9fc4bfd3_250.8-MGP.jpg**		
Distance (ft):	**250.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**53774781-f3fe-4198-bb68-4c7944f5b8d9_261.1-FM.jpg**		
Distance (ft):	**261.1**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**697a8065-5940-443d-845b-043e9b609e0c_267.6-FL.jpg**		
Distance (ft):	**267.6**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**470dbb7f-8ae9-42df-9fb4-aec51c918dda_279.1-AMH.jpg**		
Distance (ft):	**279.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1011 to 07-1012	07-1011	07-1012	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		0	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	01:56 PM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		422
Media Label	Reverse Setup	Work Order No	Additional Info	
NS23-1472	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
42	42	0
Overall Index	Structural Index	Maintenance Index
2.8	2.8	0
Overall Quick	Structural Quick	Maintenance Quick
4238	4238	0000

- abandoned survey
- water level low
- various cracks and fractures

Recommendation

① Spot Repair : J422 to 428

② CIPP Entire length of pipe

Joint every 3ft

07-1011

Camera Direction

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 15% of cross sectional area (15%
-	50.2	[MGP] General Photo (20% WL)
-	100.1	[MGP] General Photo
4	107.6	[FM] Fracture Multiple from 9 to 3 o'clock within 8" of joint J (105 - 108)
-	131	[TF] Tap Factory at 2 o'clock
-	133.4	[TFA] Tap Factory Active at 10 o'clock
3	137.6	[CM] Crack Multiple from 9 to 10 o'clock within 8" of joint @ J-138
-	150	[MGP] General Photo
2	152.8	[CL] Crack Longitudinal at 1 o'clock within 8" of joint @ J153
2	193	[CL] Crack Longitudinal at 3 o'clock within 8" of joint @ J193
3	196.1	[FL] Fracture Longitudinal at 3 o'clock within 8" of joint @ J196
-	200.8	[MGP] General Photo
-	209.9	[TF] Tap Factory at 2 o'clock
-	212.6	[TF] Tap Factory at 10 o'clock
2	219.9	[SSS] Surface Spalling at 12 o'clock within 8" of joint @ J220
2	244.7	[SSS] Surface Spalling from 10 to 12 o'clock within 8" of joint @ J244
-	250.1	[MGP] General Photo
3	266.1	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint ← J266
-	280	[TF] Tap Factory at 2 o'clock
-	282.5	[TF] Tap Factory at 10 o'clock
-	290.9	[TB] Tap Break-in at 11 o'clock
-	300.6	[MGP] General Photo 25% WL
3	314.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint ← J 314
-	314.4	[MWL] Water Level 25% of cross sectional area (25%)
-	328.7	[TBA] Tap Break-in Active at 12 o'clock
-	350.4	[MGP] General Photo
-	352.8	[TF] Tap Factory at 2 o'clock
-	355.4	[TF] Tap Factory at 10 o'clock
3	362.5	[FL] Fracture Longitudinal at 4 o'clock within 8" of joint @ J 363
3	368.8	[FL] Fracture Longitudinal at 9 o'clock within 8" of joint ← J 369
-	376.4	[TB] Tap Break-in at 11 o'clock
3	384.2	[FL] Fracture Longitudinal at 3 o'clock within 8" of joint @ J384
2	396.6	[SSS] Surface Spalling from 12 to 1 o'clock within 8" of joint @ J397
-	400.4	[MGP] General Photo WL - 15%
3	402	[FL] Fracture Longitudinal at 3 o'clock within 8" of joint (J400 - 403)
4	414.8	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint @ J415
-	422.2	[MSA] Abandoned Survey Remarks: Unknown

07-1012

Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	15% of cross sectional area				15	☐		
-	50.2	MGP	General Photo						☐		
-	100.1	MGP	General Photo						☐		
4	107.6	FM	Fracture Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3
-	131	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	133.4	TFA	Tap Factory Active	at 10 o'clock		4			☐	10	
3	137.6	CM	Crack Multiple	from 9 to 10 o'clock within 8" of joint					☑	9	10
-	150	MGP	General Photo						☐		
2	152.8	CL	Crack Longitudinal	at 1 o'clock within 8" of joint					☑	1	
2	193	CL	Crack Longitudinal	at 3 o'clock within 8" of joint					☑	3	
3	196.1	FL	Fracture Longitudinal	at 3 o'clock within 8" of joint					☑	3	
-	200.8	MGP	General Photo						☐		
-	209.9	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	212.6	TF	Tap Factory	at 10 o'clock		4			☐	10	
2	219.9	SSS	Surface Spalling	at 12 o'clock within 8" of joint					☑	12	
2	244.7	SSS	Surface Spalling	from 10 to 12 o'clock within 8" of joint					☑	10	12
-	250.1	MGP	General Photo						☐		
3	266.1	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
-	280	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	282.5	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	290.9	TB	Tap Break-in	at 11 o'clock		4			☐	11	
-	300.6	MGP	General Photo						☐		
3	314.4	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	314.4	MWL	Water Level	25% of cross sectional area				25	☐		
-	328.7	TBA	Tap Break-in Active	at 12 o'clock		4			☐	12	
-	350.4	MGP	General Photo						☐		
-	352.8	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	355.4	TF	Tap Factory	at 10 o'clock		4			☐	10	
3	362.5	FL	Fracture Longitudinal	at 4 o'clock within 8" of joint					☑	4	
3	368.8	FL	Fracture Longitudinal	at 9 o'clock within 8" of joint					☑	9	
-	376.4	TB	Tap Break-in	at 11 o'clock		4			☐	11	
3	384.2	FL	Fracture Longitudinal	at 3 o'clock within 8" of joint					☑	3	
2	396.6	SSS	Surface Spalling	from 12 to 1 o'clock within 8" of joint					☑	12	1
-	400.4	MGP	General Photo						☐		
3	402	FL	Fracture Longitudinal	at 3 o'clock within 8" of joint					☑	3	
4	414.8	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	422.2	MSA	Abandoned Survey	Remarks: Unknown					☐		

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**dc6dfb92-7c8f-4e3b-83af-fcb6dc6c546b_0-AMH.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Begin survey**		

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**0faa84f6-c210-49de-9cf1-64b4089bc97f_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**15**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

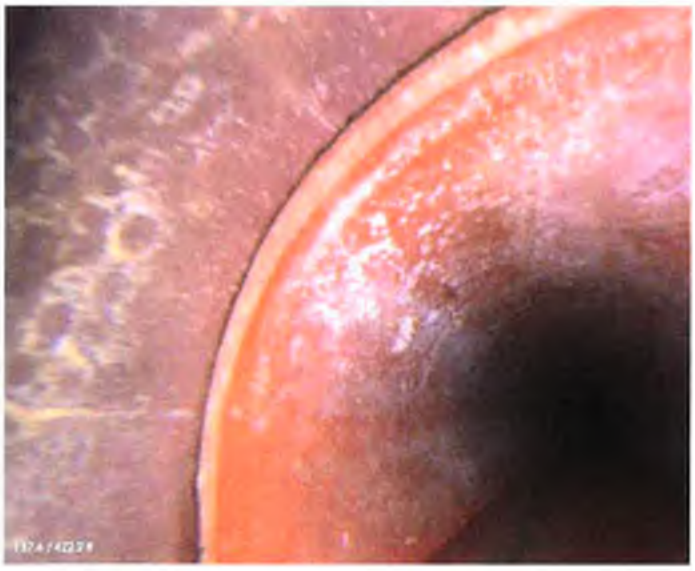
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**cd0f2c3c-be03-48d8-b6a9-901a67011601_50.2-MGP.jpg**		
Distance (ft):	**50.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**5ae5dcc5-7292-4ddb-bd66-41963e98abad_100.1-MGP.jpg**		
Distance (ft):	**100.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**b678c27b-b0bf-4d04-b743-2b4307f5812d_107.6-FM.jpg**		
Distance (ft):	**107.6**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

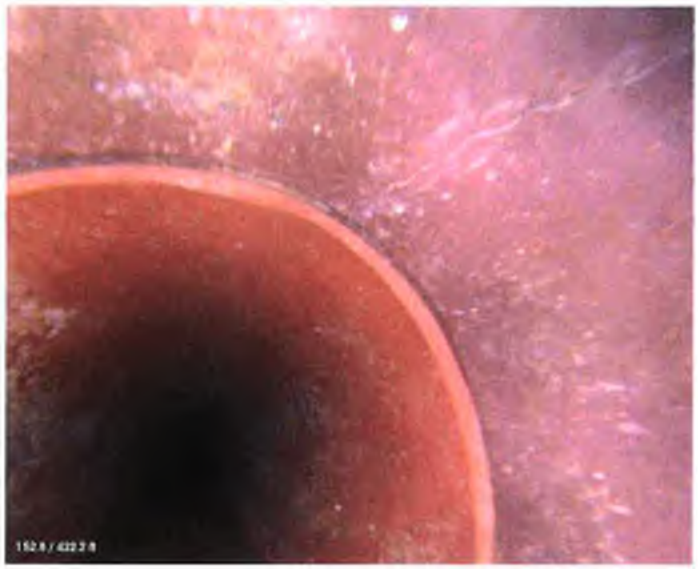
PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**2700176f-3e89-45e6-a751-b59ab4e2e568_131-TF.jpg**		
Distance (ft):	**131**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**TFA**		
Description:	**Tap Factory Active**		
Image Name:	**70c1f754-cee2-4043-ad9e-97522a6f3ec9_133.4-TFA.jpg**		
Distance (ft):	**133.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**018e15bf-5080-418e-8bb1-31b03c063ca8_137.6-CM.jpg**		
Distance (ft):	**137.6**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**10**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**b1d7f54c-071a-4dd1-98fa-dbe9039d215b_150-MGP.jpg**		
Distance (ft):	**150**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

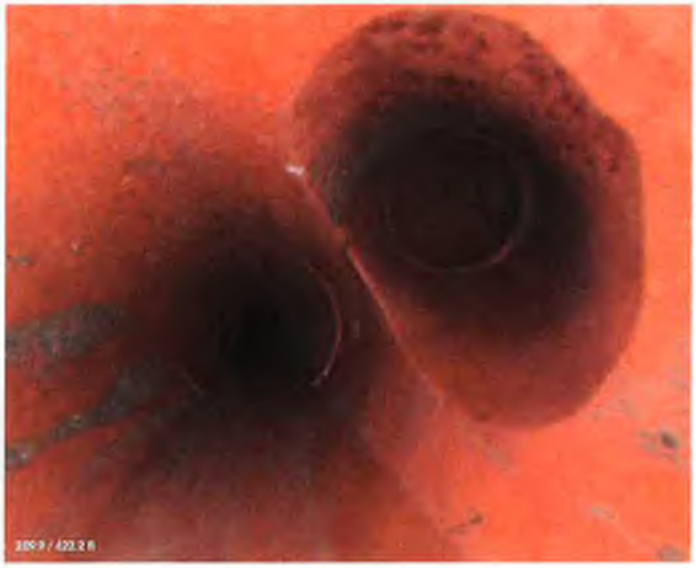


PACP Code:	CL		
Description:	**Crack Longitudinal**		
Image Name:	**b59e92ac-6e0b-4164-9c01-9743718098c8_152.8-CL.jpg**		
Distance (ft):	**152.8**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

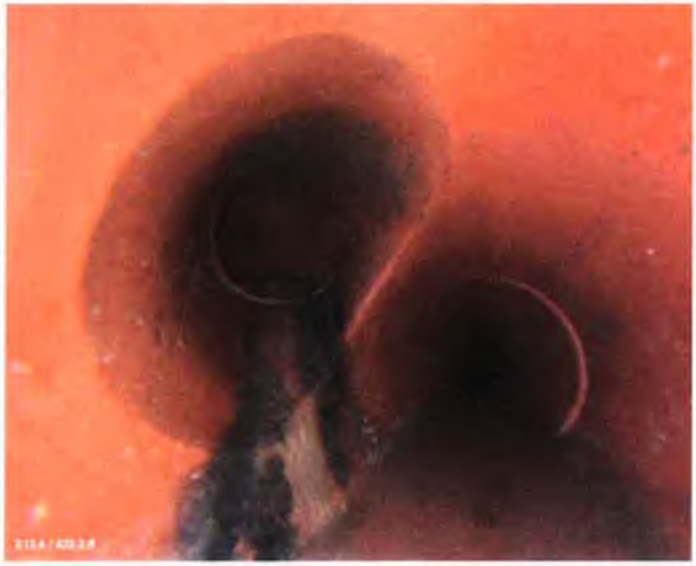
PACP Code:	CL		
Description:	**Crack Longitudinal**		
Image Name:	**ebf96400-d995-4eb7-87c1-4e2c97e53d63_193-CL.jpg**		
Distance (ft):	**193**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**eeabb85c-90f1-42de-8e62-63116959c722_196.1-FL.jpg**		
Distance (ft):	**196.1**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	58e5a77e-07a4-4b51-a304-930eba46a884_200.8-MGP.jpg		
Distance (ft):	200.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

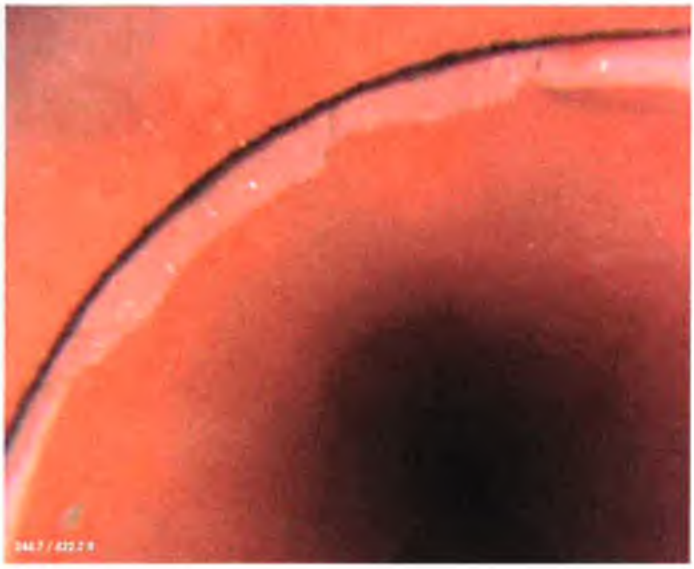


PACP Code:	TF		
Description:	Tap Factory		
Image Name:	08ff27bd-8273-4953-8cd3-b6e5f3045b43_209.9-TF.jpg		
Distance (ft):	209.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



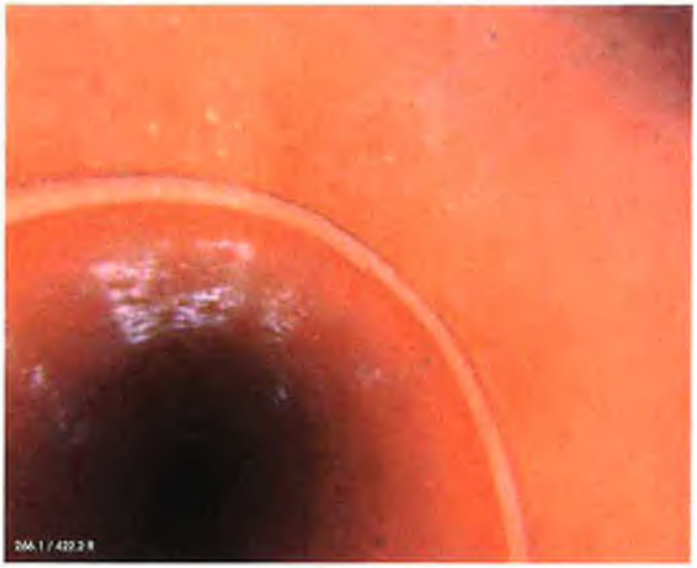
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	108e3474-1fbc-4009-968b-a1e7878199dd_212.6-TF.jpg		
Distance (ft):	212.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**SSS**		
Description:	**Surface Spalling**		
Image Name:	**99230f76-aac8-42af-aa5a-72a27bdb255e_219.9-SSS.jpg**		
Distance (ft):	**219.9**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**SSS**		
Description:	**Surface Spalling**		
Image Name:	**c71998f2-dff1-433a-b0e0-2be6909540e4_244.7-SSS.jpg**		
Distance (ft):	**244.7**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**12**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**ff7841af-3590-4754-8b41-a2767ddba381_250.1-MGP.jpg**		
Distance (ft):	**250.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	67701650-ad59-4ec3-bb29-2a8102d4c1fb_266.1-FL.jpg		
Distance (ft):	266.1		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	9fd7c25b-72f2-40f6-8d6c-72f782d8c379_280-TF.jpg		
Distance (ft):	280		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	6f973691-9592-4734-b7a6-4afddf2a9568_282.5-TF.jpg		
Distance (ft):	282.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**TB**		
Description:	**Tap Break-in**		
Image Name:	**b409aca4-65c5-4f59-aad7-7d60a2584af6_290.9-TB.jpg**		
Distance (ft):	**290.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

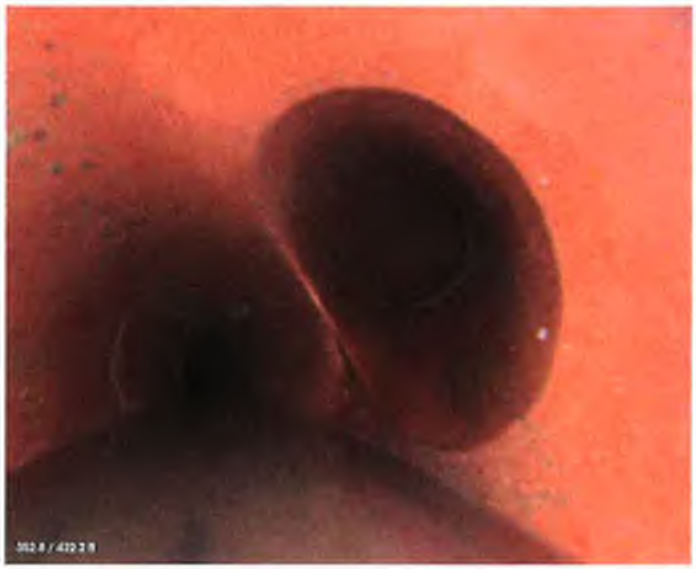
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**c90e8b95-e9e0-4b10-96ee-e9c3df283931_300.6-MGP.jpg**		
Distance (ft):	**300.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**d1ccafc5-0eaf-4f1e-8070-fc9b68202609_314.4-FL.jpg**		
Distance (ft):	**314.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

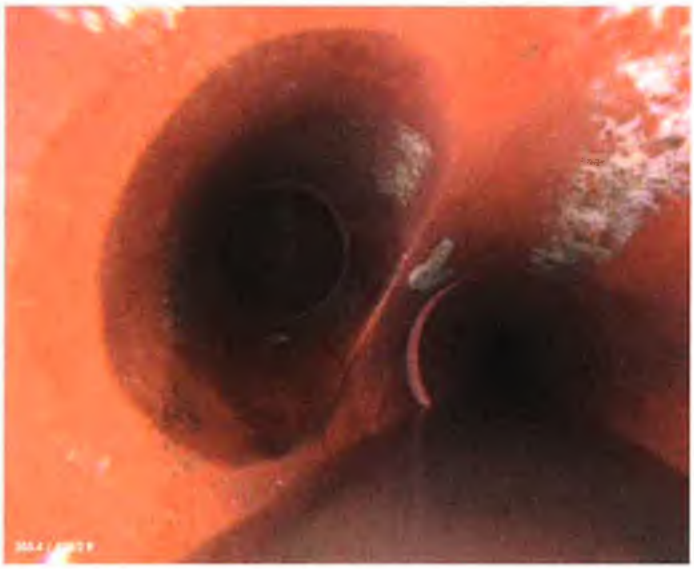
PACP Code:	MWL		
Description:	Water Level		
Image Name:	78d4bfb7-ff58-4239-bf48-393c82586537_314.4-MWL.jpg		
Distance (ft):	314.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	25		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TBA		
Description:	Tap Break-in Active		
Image Name:	ba659f56-cb6d-477a-b3eb-09db073a62bc_328.7-TBA.jpg		
Distance (ft):	328.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	402a788c-07e1-4281-a52f-01dbf87cd931_350.4-MGP.jpg		
Distance (ft):	350.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



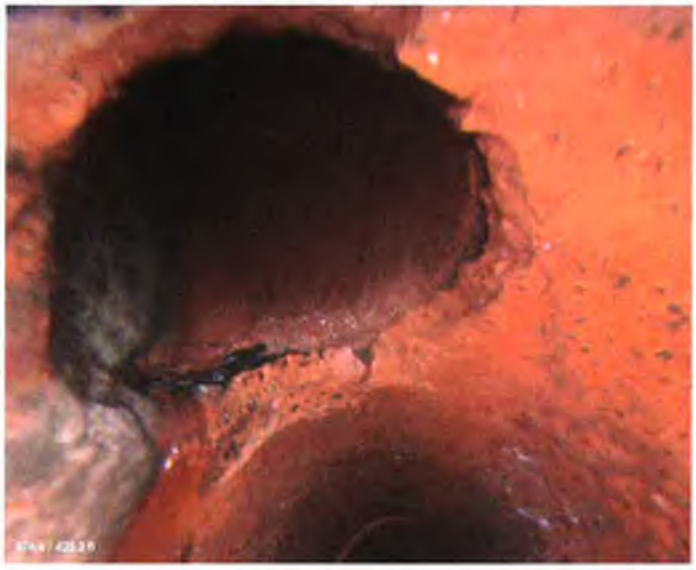
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	3c7f6aef-dea9-419b-966b-c029c408a41b_352.8-TF.jpg		
Distance (ft):	352.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	Tap Factory		
Image Name:	d48c39d5-fd5f-4e59-8878-78d346387734_355.4-TF.jpg		
Distance (ft):	355.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	b757034f-dadd-4d1d-ba6c-92ba23ef9973_362.5-FL.jpg		
Distance (ft):	362.5		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	4	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**b469b0ff-7e36-48b1-8f03-dfbe3b2fdcfa_368.8-FL.jpg**		
Distance (ft):	**368.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



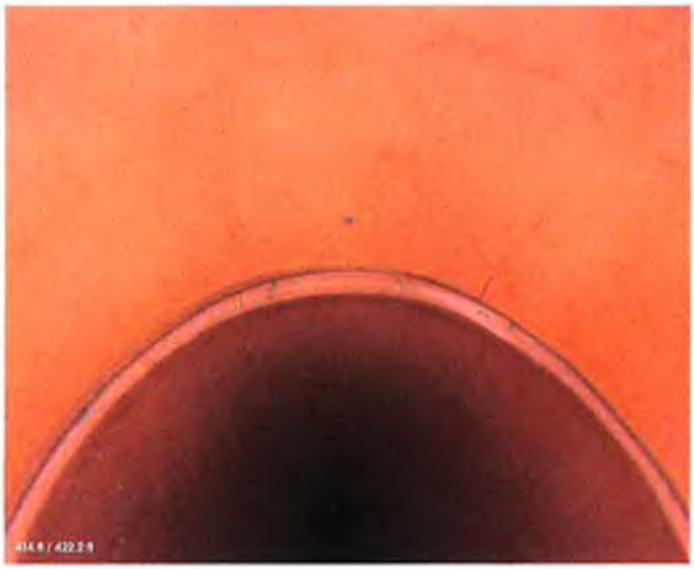
PACP Code:	TB		
Description:	**Tap Break-in**		
Image Name:	**1fe1e362-54b1-438c-bd29-4212c5936d86_376.4-TB.jpg**		
Distance (ft):	**376.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**3769d8fa-3e0a-4586-9814-7543dadb0361_384.2-FL.jpg**		
Distance (ft):	**384.2**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	SSS		
Description:	**Surface Spalling**		
Image Name:	**0aae1966-f9df-4f6b-ac31-7c9198959816_396.6-SSS.jpg**		
Distance (ft):	**396.6**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**78a3e3b7-df68-4a43-8ad7-f851d5c6719f_400.4-MGP.jpg**		
Distance (ft):	**400.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**077502d1-a351-45c5-8270-ca9cb4aaad4a_402-FL.jpg**		
Distance (ft):	**402**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**6058bbb2-fa63-4b14-ae28-925448ba390d_414.8-FM.jpg**		
Distance (ft):	**414.8**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MSA**		
Description:	**Abandoned Survey**		
Image Name:	**eeffd9c1-f17a-43ea-926f-02d593eafbe6_422.2-MSA.jpg**		
Distance (ft):	**422.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Unknown**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1011 to 07-1010	07-1011	07-1010	Vitrified Clay Pipe	8	8
Shape	**Sewer Use**	**Drainage Area**	**Lining Method**	**Total Length**	**Joint Length**
Circular	Sanitary	NA		327	0
Pre-Cleaning	**Clean Date**	**Flow Control**	**Purpose**	**Year Laid**	**Year Renewed**
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	01:54 PM	Downstream
Owner	**Customer**	**Weather**	**PO Number**	**Length Surveyed**
City of Arvin	Veolia	Dry		327
Media Label	**Reverse Setup**	**Work Order No**	**Additional Info**	
NS14-1645	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
30	30	0
Overall Index	**Structural Index**	**Maintenance Index**
3.33	3.33	0
Overall Quick	**Structural Quick**	**Maintenance Quick**
4532	4532	0000

Recommendation

- CIPP entire length of pipe
  (due to many cracks and fractures at joints)
  + refer to notes on which joints

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 5% of cross sectional area (5%)
-	7.6	[TF] Tap Factory at 10 o'clock
4	9.5	[FM] Fracture Multiple from 12 to 3 o'clock within 8" of joint (8 – 11) 3
-	10	[TF] Tap Factory at 3 o'clock
-	50	[MGP] General Photo
-	58.7	[TF] Tap Factory at 10 o'clock
4	85.2	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint (83.5 – 86.5) 3
-	88.8	[TF] Tap Factory at 2 o'clock
-	100.3	[MGP] General Photo
4	115.4	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint (113.5 to 116.5) 9
-	118.9	[TF] Tap Factory at 10 o'clock ↓ combine
4	121.1	[FM] Fracture Multiple from 2 to 4 o'clock within 8" of joint (119.5 to 122.5)
4	133.2	[FM] Fracture Multiple from 9 to 1 o'clock within 8" of joint (131.5 to 134.5) 3
-	143	[TF] Tap Factory at 3 o'clock
-	150.8	[MGP] General Photo
3	160.2	[CM] Crack Multiple from 1 to 4 o'clock within 8" of joint (158.5 to 161.5)
2	178.6	[CL] Crack Longitudinal at 9 o'clock within 8" of joint (179 – 181)
-	185.3	[TF] Tap Factory at 9 o'clock
-	200.6	[MGP] General Photo
3	236.2	[CM] Crack Multiple from 11 to 1 o'clock within 8" of joint (134.5 to 239)
-	237	[TF] Tap Factory at 2 o'clock
-	238.5	[MGO] General Observation Remarks: Suds. Begin using rear camera due to poor quality images f
-	243.3	[TF] Tap Factory at 10 o'clock
-	250.4	[MGP] General Photo
-	264.2	[TF] Tap Factory at 2 o'clock
2	275.2	[CL] Crack Longitudinal at 10 o'clock within 8" of joint (273.5 to 276.5)
-	300.6	[MGP] General Photo
-	309.5	[TF] Tap Factory at 10 o'clock
-	327.6	[AMH] Manhole Remarks: End of survey

07-1011

Joint every 35ft

Camera Direction

07-1010

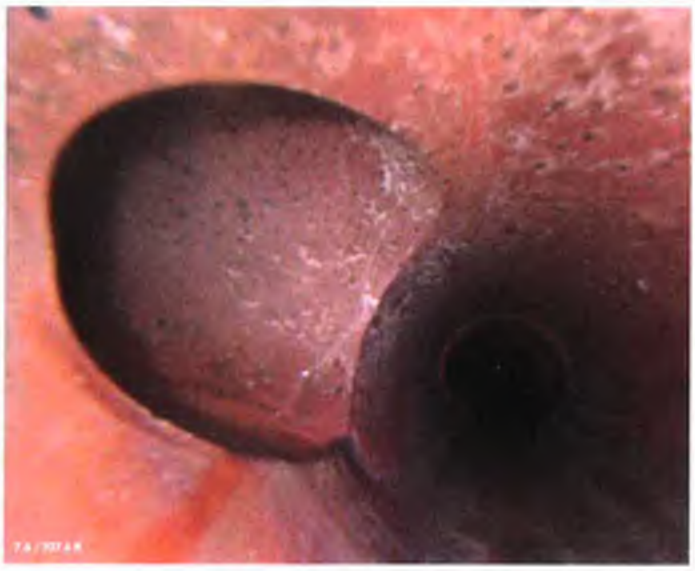
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	5% of cross sectional area				5	☐		
-	7.6	TF	Tap Factory	at 10 o'clock		4			☐	10	
4	9.5	FM	Fracture Multiple	from 12 to 3 o'clock within 8" of joint					☑	12	3

-	10	TF	Tap Factory	at 3 o'clock		4			☐	3	
-	50	MGP	General Photo						☐		
-	58.7	TF	Tap Factory	at 10 o'clock		4			☐	10	
4	85.2	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	88.8	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	100.3	MGP	General Photo						☐		
4	115.4	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	118.9	TF	Tap Factory	at 10 o'clock		4			☐	10	
4	121.1	FM	Fracture Multiple	from 2 to 4 o'clock within 8" of joint					☑	2	4
4	133.2	FM	Fracture Multiple	from 9 to 1 o'clock within 8" of joint					☑	9	1
-	143	TF	Tap Factory	at 3 o'clock		4			☐	3	
-	150.8	MGP	General Photo						☐		
3	160.2	CM	Crack Multiple	from 1 to 4 o'clock within 8" of joint					☑	1	4
2	178.6	CL	Crack Longitudinal	at 9 o'clock within 8" of joint					☑	9	
-	185.3	TF	Tap Factory	at 9 o'clock		4			☐	9	
-	200.6	MGP	General Photo						☐		
3	236.2	CM	Crack Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	237	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	238.5	MGO	General Observation	Remarks: Suds. Begin using rear camera due to poor quality images from front camera. Clocking angles are from front camera point of view.					☐		
-	243.3	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	250.4	MGP	General Photo						☐		
-	264.2	TF	Tap Factory	at 2 o'clock		4			☐	2	
2	275.2	CL	Crack Longitudinal	at 10 o'clock within 8" of joint					☑	10	
-	300.6	MGP	General Photo						☐		
-	309.5	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	327.6	AMH	Manhole	Remarks: End of survey					☐		

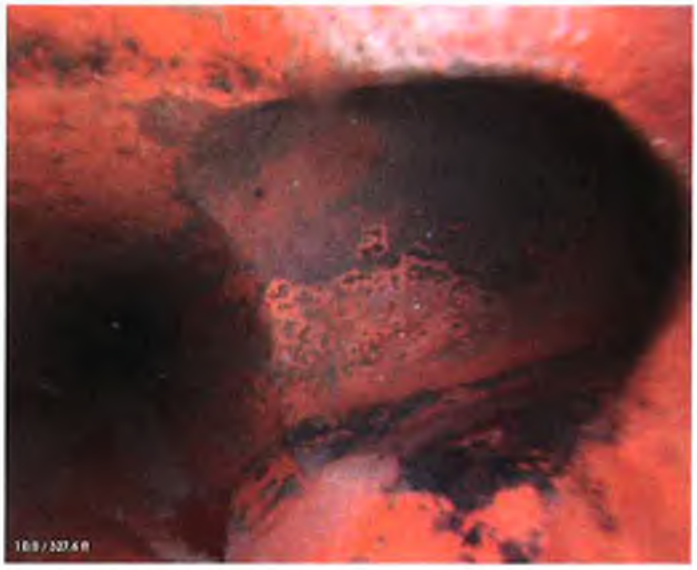
PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**2dc3153b-3731-4256-b52d-638ab0a5a167_0-AMH.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Begin survey**		

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**f464ac69-cf37-43ea-ad07-b7b0164a2862_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**5**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



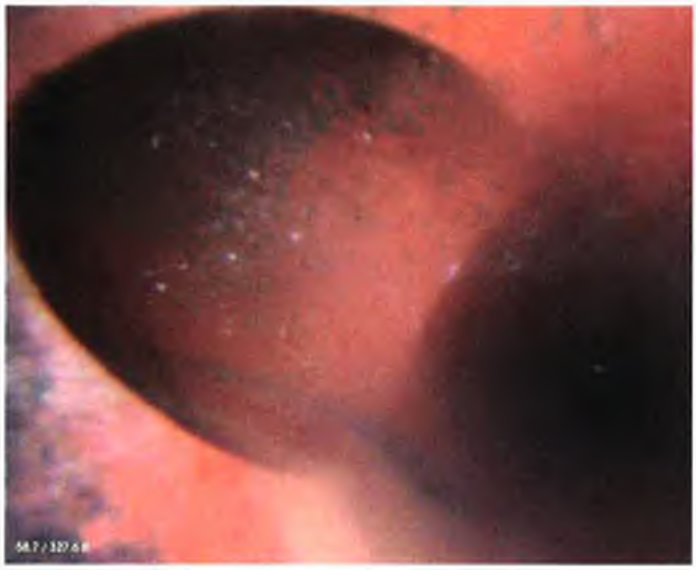
PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**29a92825-eba5-4bd3-98d6-2062a044380a_7.6-TF.jpg**		
Distance (ft):	**7.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**4ac5caa0-b050-4fae-8deb-2bb6edb9836e_9.5-FM.jpg**		
Distance (ft):	**9.5**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



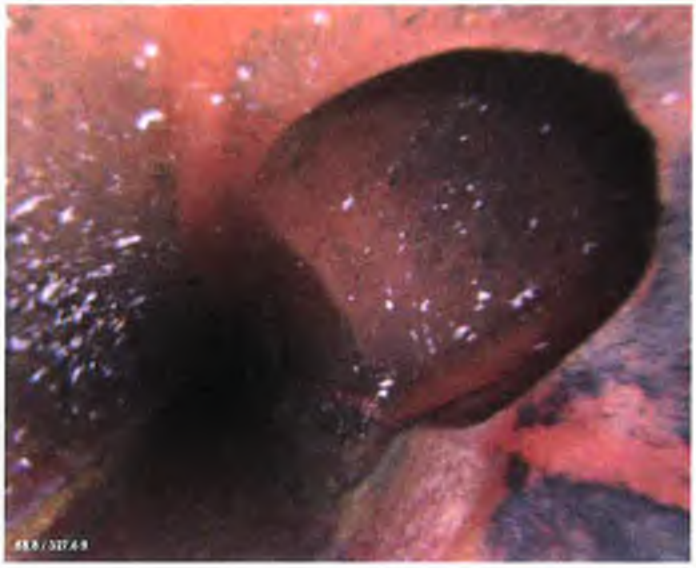
PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**4935551a-63e9-4258-97ee-7d92e77518f6_10-TF.jpg**		
Distance (ft):	**10**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**f5cd6d67-5cf1-437d-907a-f1c188755f4f_50-MGP.jpg**		
Distance (ft):	**50**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



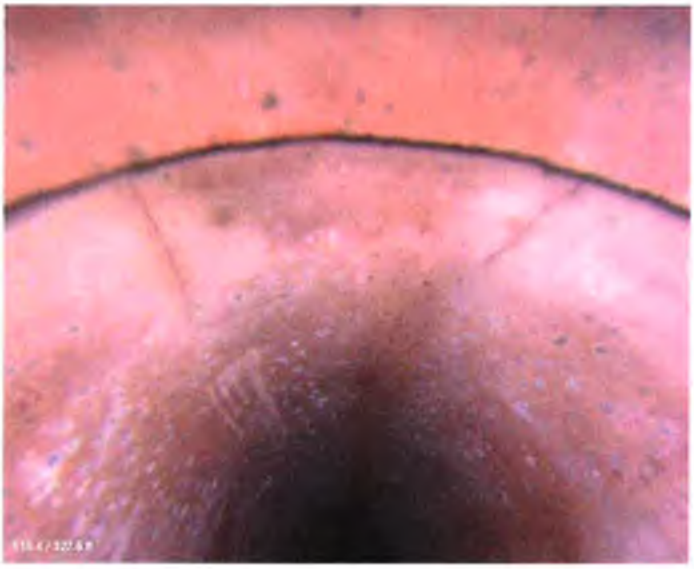
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	e319c6b9-8660-4adb-a6ea-3fb404ea4353_58.7-TF.jpg		
Distance (ft):	58.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	45755cd5-b012-4c36-bd2d-2c271ccb3937_85.2-FM.jpg		
Distance (ft):	85.2		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	1
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



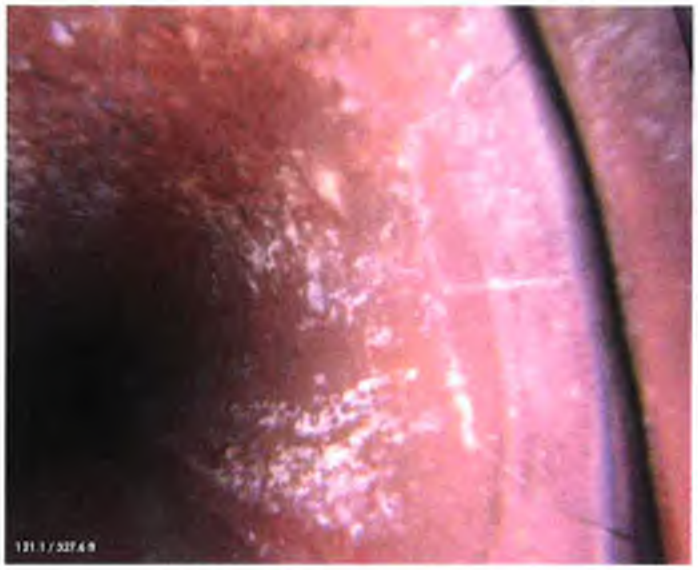
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	31e2cee3-3c31-4894-9603-b209a521362d_88.8-TF.jpg		
Distance (ft):	88.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	41a9dbd0-f842-4214-ae0b-e5e973135fd3_100.3-MGP.jpg		
Distance (ft):	100.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

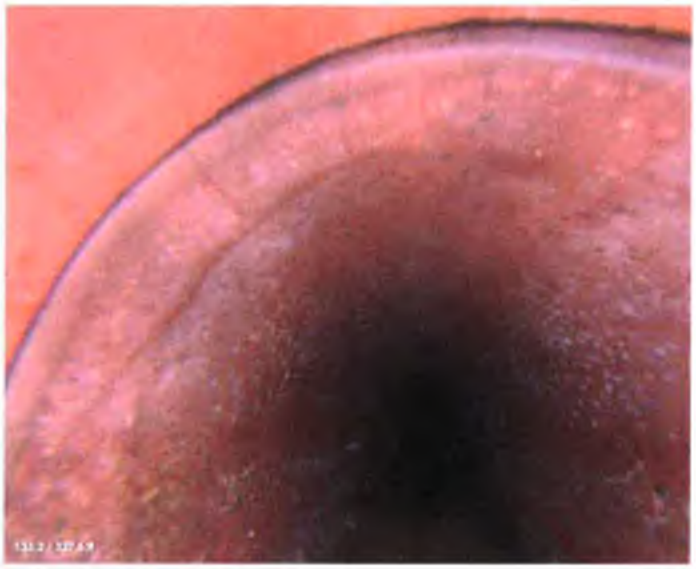


PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	c39fbbee-eb35-48a7-b3f6-2aa19e9900ba_115.4-FM.jpg		
Distance (ft):	115.4		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	1
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	5442e784-73d0-4156-9282-a3c0aca52ce7_118.9-TF.jpg		
Distance (ft):	118.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**abe364a4-76c0-42d6-824b-3449b8a05c12_121.1-FM.jpg**		
Distance (ft):	**121.1**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

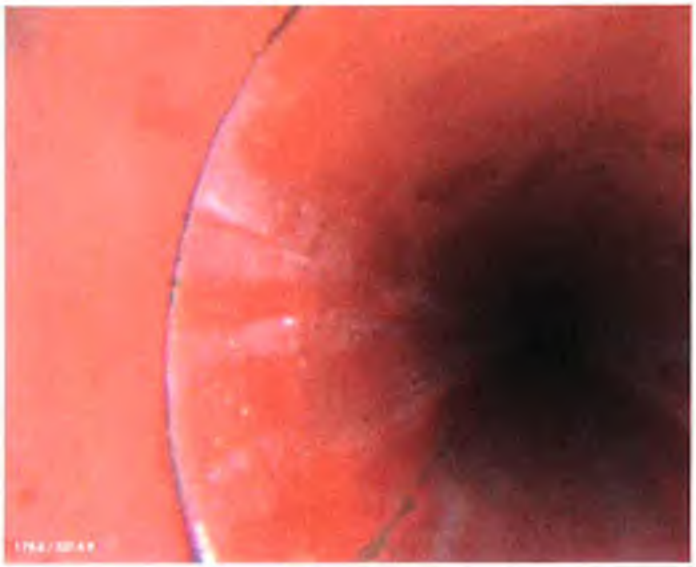


PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**20b82862-816f-4b59-895f-82af49277ffe_133.2-FM.jpg**		
Distance (ft):	**133.2**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**75e16442-04e5-406a-b21c-76918d0c23aa_143-TF.jpg**		
Distance (ft):	**143**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**101a5c2c-b587-497e-9bbd-357f17a2982e_150.8-MGP.jpg**		
Distance (ft):	**150.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**1b9211f0-4a3c-491b-a20c-2fc95eca9544_160.2-CM.jpg**		
Distance (ft):	**160.2**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

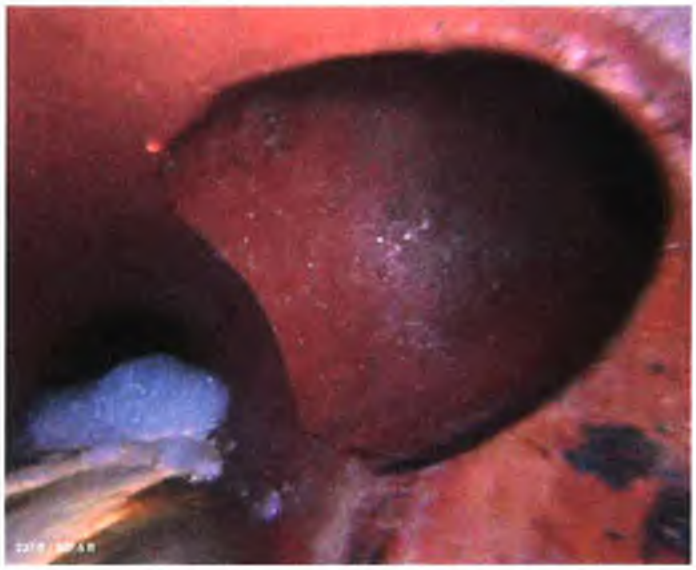


PACP Code:	**CL**		
Description:	**Crack Longitudinal**		
Image Name:	**31d6ff0f-e4e5-4318-a46e-2b2301b45030_178.6-CL.jpg**		
Distance (ft):	**178.6**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	dbaac16d-4464-442e-a749-ca3605487bb9_185.3-TF.jpg		
Distance (ft):	185.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	9	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

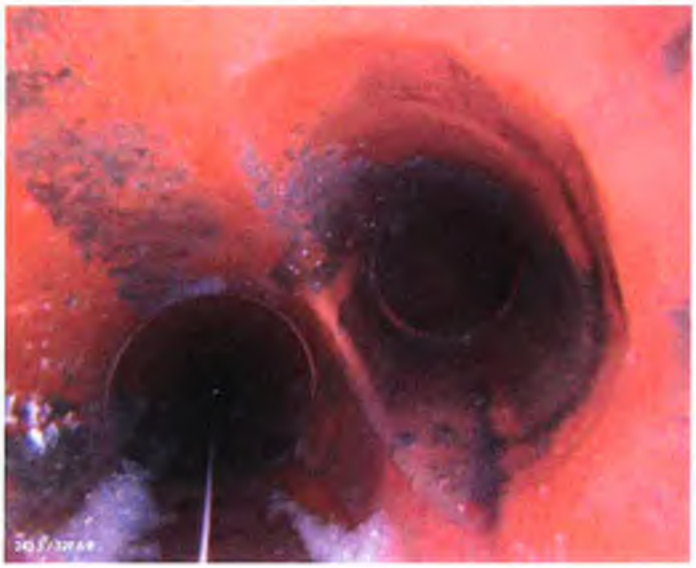
PACP Code:	MGP		
Description:	General Photo		
Image Name:	6a60662c-665c-4757-9d49-3126422e5a3d_200.6-MGP.jpg		
Distance (ft):	200.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	CM		
Description:	Crack Multiple		
Image Name:	99e03e53-983c-4784-9cb6-162eccf398ad_236.2-CM.jpg		
Distance (ft):	236.2		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	1
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



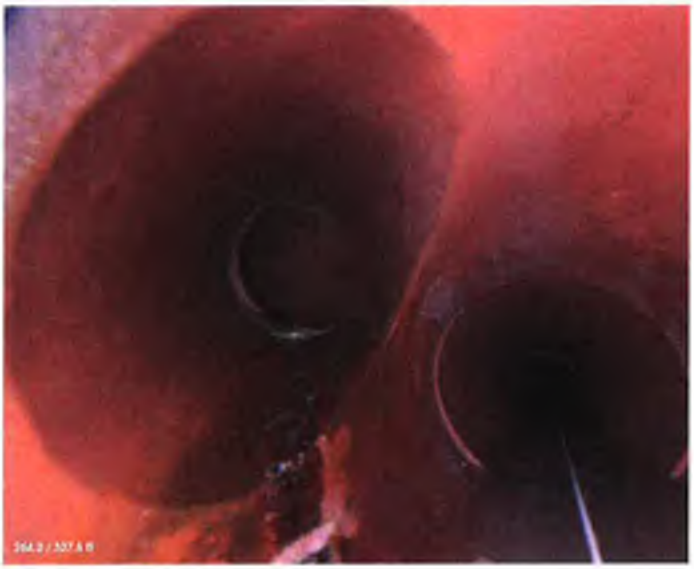
PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**f464e354-ea9d-43fc-a3ed-9b06cbeb36b0_237-TF.jpg**		
Distance (ft):	**237**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGO**		
Description:	**General Observation**		
Image Name:	**1d226fba-9cb4-41b2-bae5-763a6bea3cb2_238.5-MGO.jpg**		
Distance (ft):	**238.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Suds. Begin using rear camera due to poor quality images from front camera. Clocking angles are from front camera point of view.**		

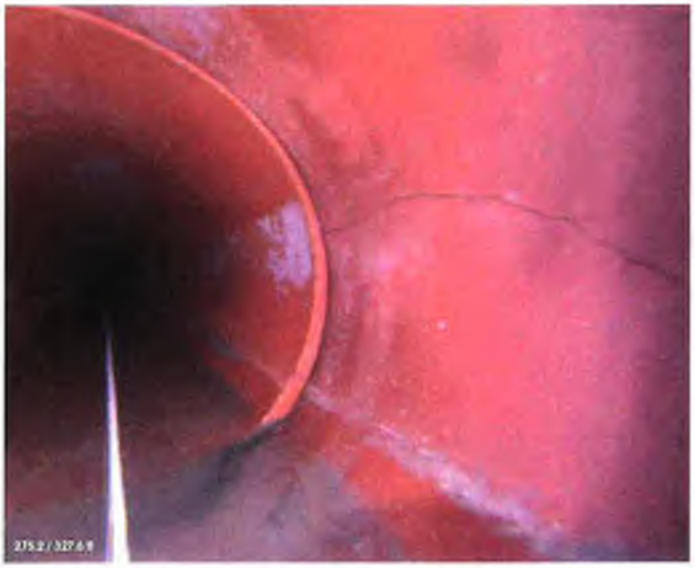


PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**0d2af7b5-d00e-48d1-a6be-832eb9662c27_243.3-TF.jpg**		
Distance (ft):	**243.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	5a57a9a1-059c-47a0-a5ba-1cb85d1c733f_250.4-MGP.jpg		
Distance (ft):	250.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

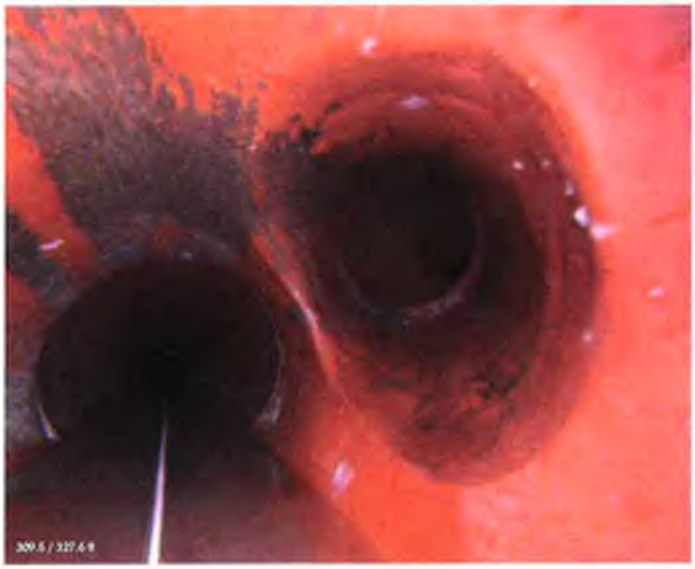


PACP Code:	TF		
Description:	Tap Factory		
Image Name:	e4c25e19-9ef9-49ae-b94d-363faacf018c_264.2-TF.jpg		
Distance (ft):	264.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	CL		
Description:	Crack Longitudinal		
Image Name:	cc07fefa-ab77-4b2d-aaf7-eeca96174cdf_275.2-CL.jpg		
Distance (ft):	275.2		
Structural Grade:	2	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**bf74c6f2-8db8-497b-ba75-ca1420d5c4ba_300.6-MGP.jpg**		
Distance (ft):	**300.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**13060f3b-03a5-4f11-894f-00ccd326cd60_309.5-TF.jpg**		
Distance (ft):	**309.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**4d4914d5-a65f-4bb4-bf9d-99668c8a3ef9_327.6-AMH.jpg**		
Distance (ft):	**327.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1010 to 07-1018	07-1010	07-1018	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		329	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	01:44 PM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		329
Media Label	Reverse Setup	Work Order No	Additional Info	
NS22-919	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
43	43	0
Overall Index	Structural Index	Maintenance Index
3.58	3.58	0
Overall Quick	Structural Quick	Maintenance Quick
4931	4931	0000

- Large Sag at the beginning of the pipe
- Various cracks and fractures (CIPP)

Recommendation

① Spot Repair (83 Ft) (MH DS to .583)

② CIPP Lining entire length

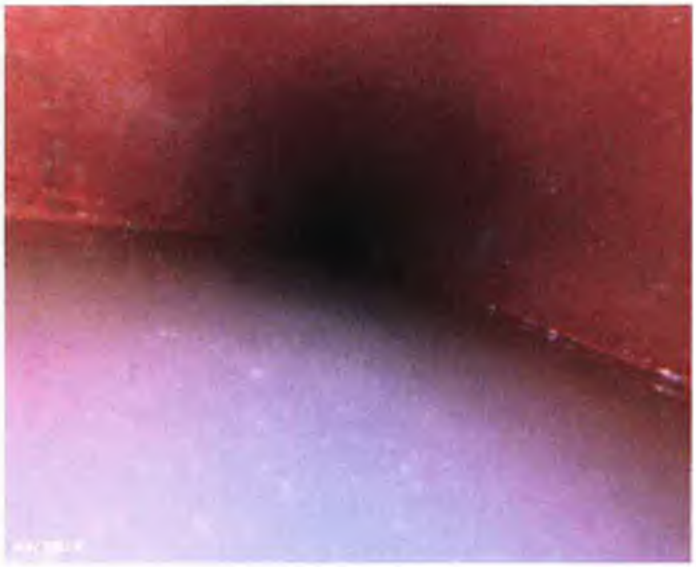
		Observation
07-1018		
-	0	[AMH] Manhole Remarks: Begin survey Joint every 38' SR (MH to 83)
-	0	[MWL] Water Level 50% of cross sectional area
-	0.3	[MGO] General Observation Remarks: Front camera under water. Begin using rear camera due to
-	37.2	[TF] Tap Factory at 2 o'clock
-	50.4	[MGP] General Photo
4	59.4	[FM] Fracture Multiple from 9 to 3 o'clock within 8" of joint @ J59
-	67.4	[TF] Tap Factory at 10 o'clock
4	71.1	[FM] Fracture Multiple from 8 to 4 o'clock within 8" of joint @ J71
4	95.7	[FM] Fracture Multiple from 9 to 3 o'clock within 8" of joint @ J95
4	98.5	[FM] Fracture Multiple from 2 to 4 o'clock within 8" of joint
-	100.5	[TF] Tap Factory at 2 o'clock WL = 50%
-	100.5	[MGP] General Photo
3	110.3	[FL] Fracture Longitudinal at 2 o'clock within 8" of joint @ J110
-	115.3	[TF] Tap Factory at 10 o'clock
2	122.3	[SSS] Surface Spalling from 7 to 2 o'clock within 8" of joint @ J122
4	134.2	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint @ J134
-	150.6	[MGP] General Photo
-	163.8	[TFA] Tap Factory Active at 2 o'clock
4	182.6	[FM] Fracture Multiple from 2 to 3 o'clock within 8" of joint J182
-	193.9	[TF] Tap Factory at 10 o'clock
-	200	[MGP] General Photo
4	212.7	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint J213
4	218.7	[FM] Fracture Multiple from 11 to 12 o'clock within 8" of joint J219
-	223.9	[TFA] Tap Factory Active at 2 o'clock
-	250.4	[MGP] General Photo
2	252	[SSS] Surface Spalling at 9 o'clock within 8" of joint J252
-	269.3	[TFA] Tap Factory Active at 10 o'clock
-	287	[TFA] Tap Factory Active at 2 o'clock
-	300	[MGP] General Photo
-	308	[TB] Tap Break-in at 11 o'clock
4	308.9	[FM] Fracture Multiple from 12 to 1 o'clock within 8" of joint J309
-	329.1	[AMH] Manhole Remarks: End of survey
07-1010		

Camera Direction

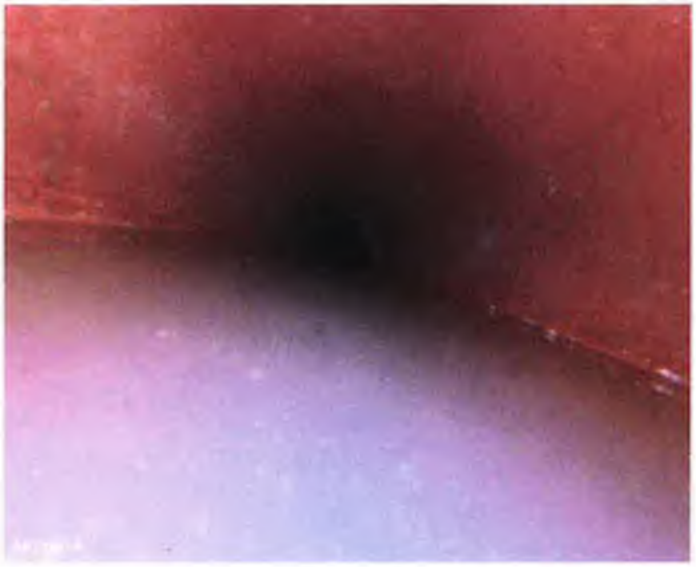
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	50% of cross sectional area				50	☐		

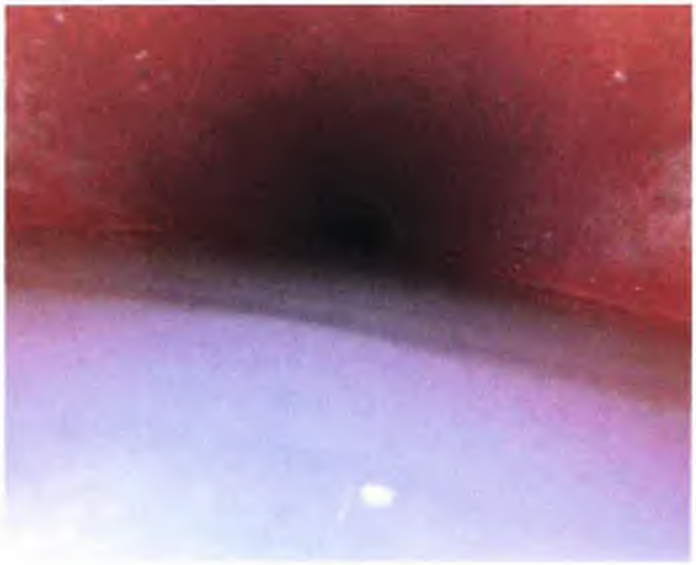
-	0.3	MGO	General Observation	Remarks: Front camera under water. Begin using rear camera due to poor quality images from front camera. Clocking angles are from front camera point of view.					☐		
-	37.2	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	50.4	MGP	General Photo						☐		
4	59.4	FM	Fracture Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3
-	67.4	TF	Tap Factory	at 10 o'clock		4			☐	10	
4	71.1	FM	Fracture Multiple	from 8 to 4 o'clock within 8" of joint					☑	8	4
4	95.7	FM	Fracture Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3
4	98.5	FM	Fracture Multiple	from 2 to 4 o'clock within 8" of joint					☑	2	4
-	100.5	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	100.5	MGP	General Photo						☐		
3	110.3	FL	Fracture Longitudinal	at 2 o'clock within 8" of joint					☑	2	
-	115.3	TF	Tap Factory	at 10 o'clock		4			☐	10	
2	122.3	SSS	Surface Spalling	from 7 to 2 o'clock within 8" of joint					☑	7	2
4	134.2	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	150.6	MGP	General Photo						☐		
-	163.8	TFA	Tap Factory Active	at 2 o'clock		4			☐	2	
4	182.6	FM	Fracture Multiple	from 2 to 3 o'clock within 8" of joint					☑	2	3
-	193.9	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	200	MGP	General Photo						☐		
4	212.7	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
4	218.7	FM	Fracture Multiple	from 11 to 12 o'clock within 8" of joint					☑	11	12
-	223.9	TFA	Tap Factory Active	at 2 o'clock		4			☐	2	
-	250.4	MGP	General Photo						☐		
2	252	SSS	Surface Spalling	at 9 o'clock within 8" of joint					☑	9	
-	269.3	TFA	Tap Factory Active	at 10 o'clock		4			☐	10	
-	287	TFA	Tap Factory Active	at 2 o'clock		4			☐	2	
-	300	MGP	General Photo						☐		
-	308	TB	Tap Break-in	at 11 o'clock		4			☐	11	
4	308.9	FM	Fracture Multiple	from 12 to 1 o'clock within 8" of joint					☑	12	1
-	329.1	AMH	Manhole	Remarks: End of survey					☐		



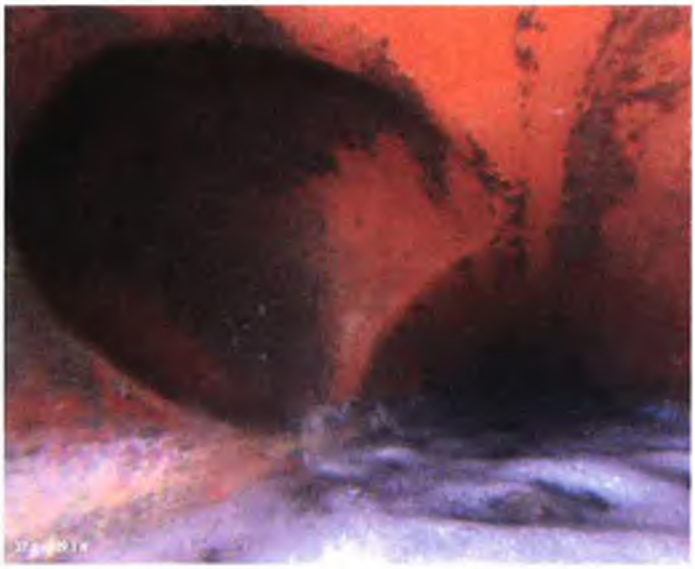
PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**373b205d-1ca3-4eb8-b63d-edcf7320f598_0-AMH.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Begin survey**		



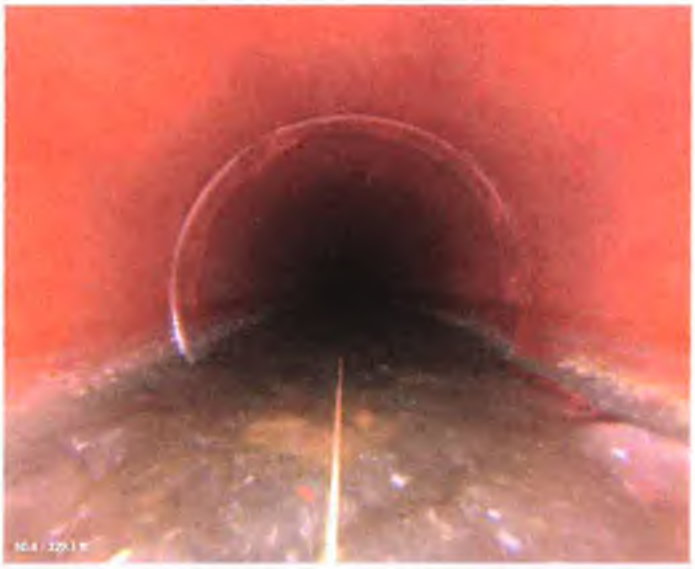
PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**7e4daaf2-f7e4-4436-8e5e-b52e1fd9e17d_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**50**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MGO**		
Description:	**General Observation**		
Image Name:	**b9410092-3792-4ab9-8fc9-56941f345e0e_0.3-MGO.jpg**		
Distance (ft):	**0.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Front camera under water. Begin using rear camera due to poor quality images from front camera. Clocking angles are from front camera point of view.**		



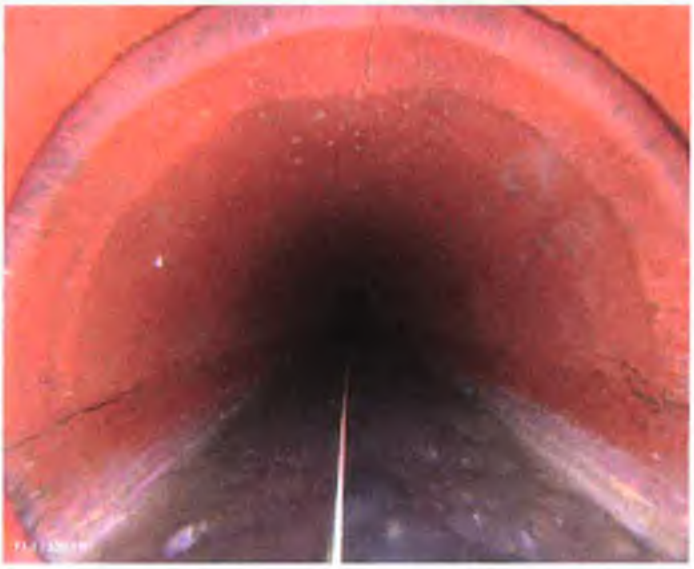
PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**6ad8809e-97c7-4f95-be95-a5bdb75b28ae_37.2-TF.jpg**		
Distance (ft):	**37.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**82a67ee5-6bf2-4b62-9402-88cde04e6336_50.4-MGP.jpg**		
Distance (ft):	**50.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

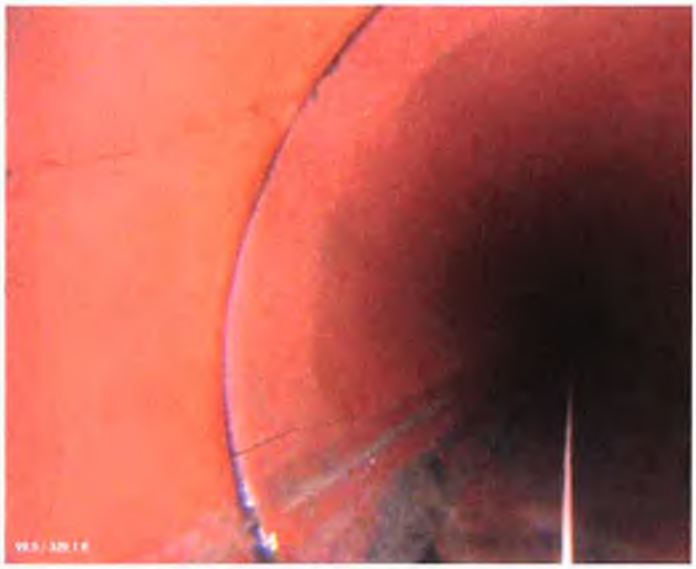
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**922942db-0891-4df8-8e8f-6a0e44224fdb_59.4-FM.jpg**		
Distance (ft):	**59.4**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**0a0ba142-fb6e-4b1e-996d-29c48b356805_67.4-TF.jpg**		
Distance (ft):	**67.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

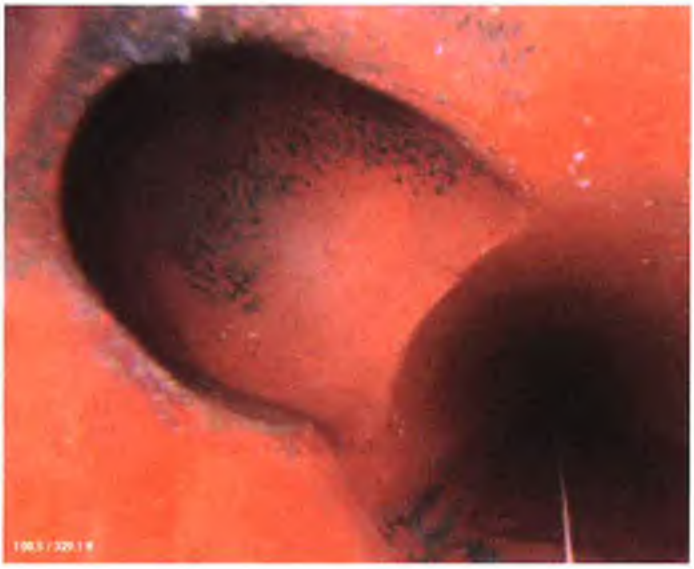


PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**4cd294a4-c9c4-4149-af49-6ebc96f7c1c0_71.1-FM.jpg**		
Distance (ft):	**71.1**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

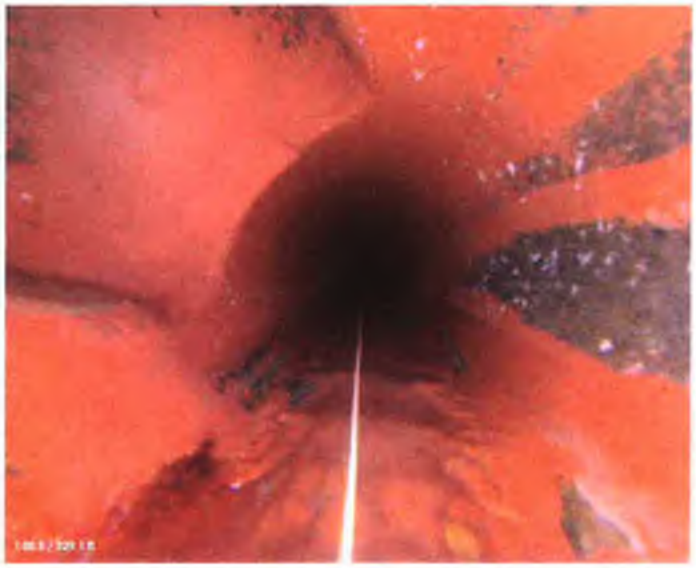
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**5b535c7e-149b-4773-92af-b4da089f73c4_95.7-FM.jpg**		
Distance (ft):	**95.7**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



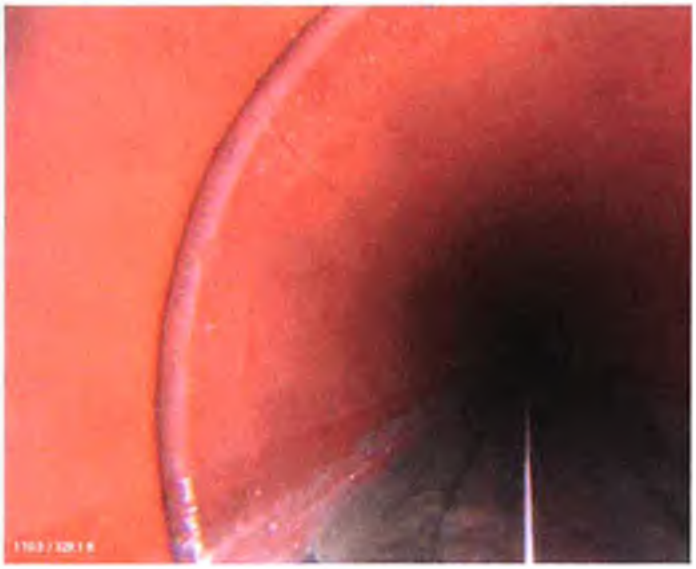
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**8eb9075a-ac58-40c5-988e-b427c45f3f33_98.5-FM.jpg**		
Distance (ft):	**98.5**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



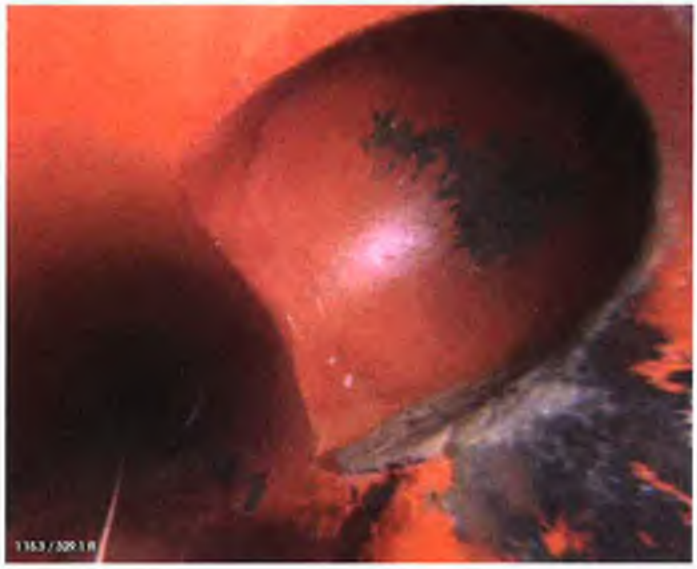
PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**a00aae31-569a-4203-9397-cef5da055c27_100.5-TF.jpg**		
Distance (ft):	**100.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**eef84c19-cb71-4776-b248-ea06678a58ac_100.5-MGP.jpg**		
Distance (ft):	**100.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**f6ac49e9-773f-484a-9bda-f5715fd5c062_110.3-FL.jpg**		
Distance (ft):	**110.3**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



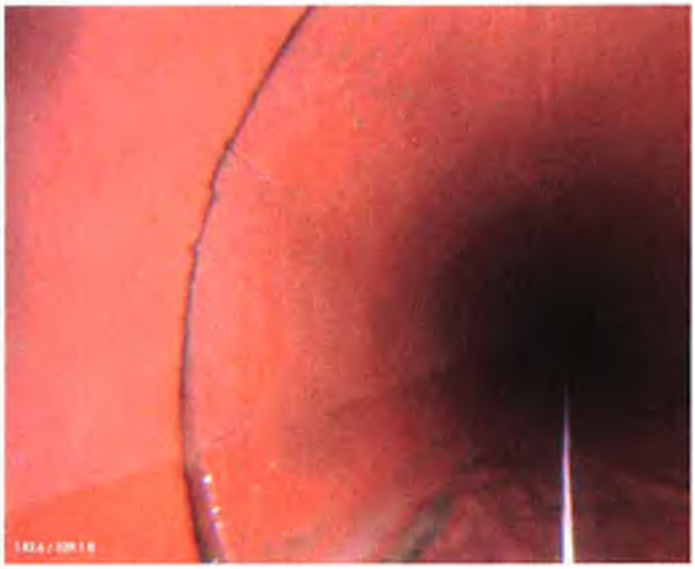
PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**3e145d51-5b71-42d4-a751-103910d0749e_115.3-TF.jpg**		
Distance (ft):	**115.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	SSS		
Description:	**Surface Spalling**		
Image Name:	**36d0be29-c9e1-4f5b-b47c-d9d92bd2be97_122.3-SSS.jpg**		
Distance (ft):	**122.3**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**7**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

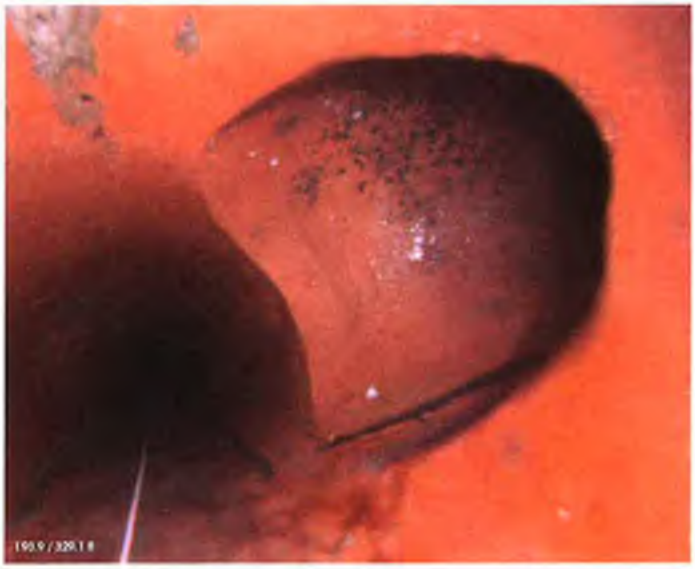
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**d7cbd672-bb50-4ede-abea-a036fbf1c0e1_134.2-FM.jpg**		
Distance (ft):	**134.2**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**c53e96b9-a125-456a-859e-9ae05d294528_150.6-MGP.jpg**		
Distance (ft):	**150.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**TFA**		
Description:	**Tap Factory Active**		
Image Name:	**8e19532d-47ab-4e60-bfb0-905bb7599662_163.8-TFA.jpg**		
Distance (ft):	**163.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



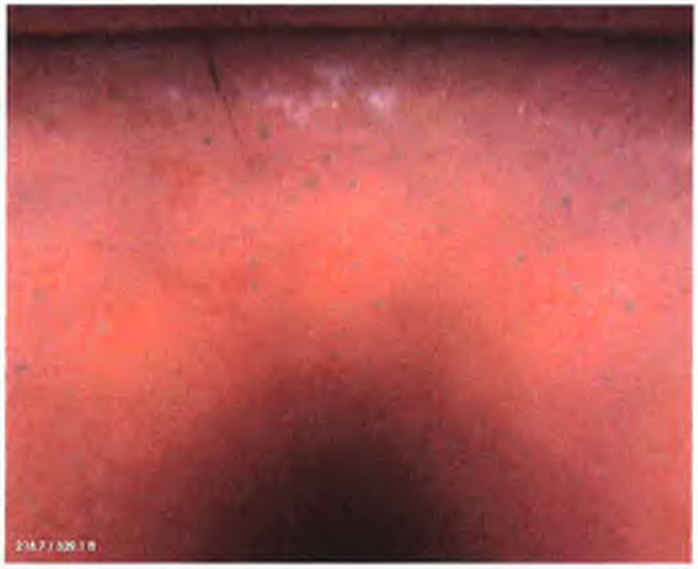
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**a8e0c9f9-dca2-41b1-98ea-16c1643da0d7_182.6-FM.jpg**		
Distance (ft):	**182.6**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



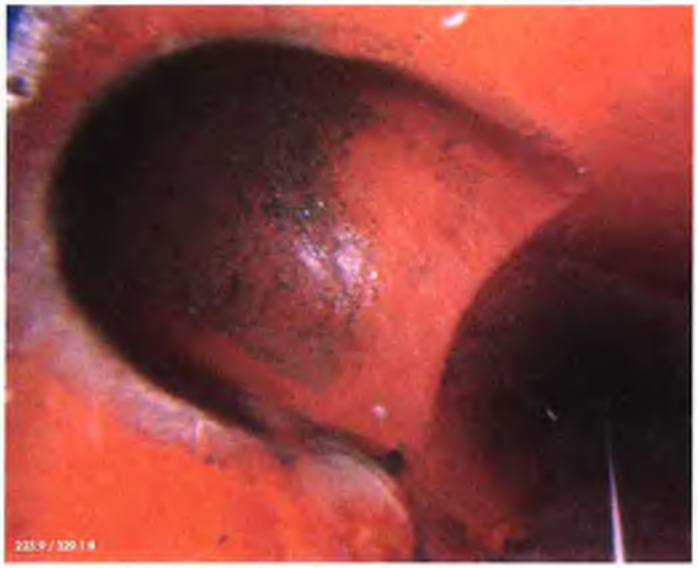
PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**02c29e61-e467-4332-9317-c38f01032d69_193.9-TF.jpg**		
Distance (ft):	**193.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**e5fce551-7379-442f-8024-f79eda8c2fcc_200-MGP.jpg**		
Distance (ft):	**200**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**5a5688b6-e792-4468-878a-bd21aac8ceae_212.7-FM.jpg**		
Distance (ft):	**212.7**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**01caa197-7e5c-43d6-abad-da4ac217950f_218.7-FM.jpg**		
Distance (ft):	**218.7**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**12**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

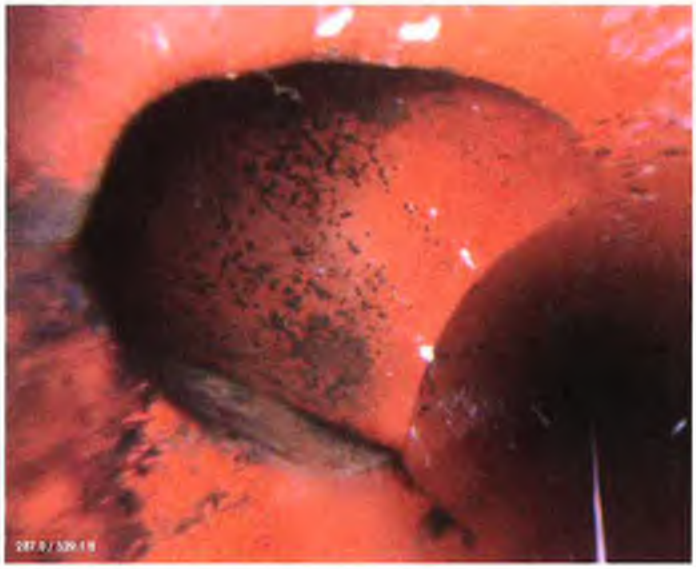


PACP Code:	TFA		
Description:	**Tap Factory Active**		
Image Name:	**a8530b6a-b9e6-491d-97f4-9d72c7c8c82d_223.9-TFA.jpg**		
Distance (ft):	**223.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

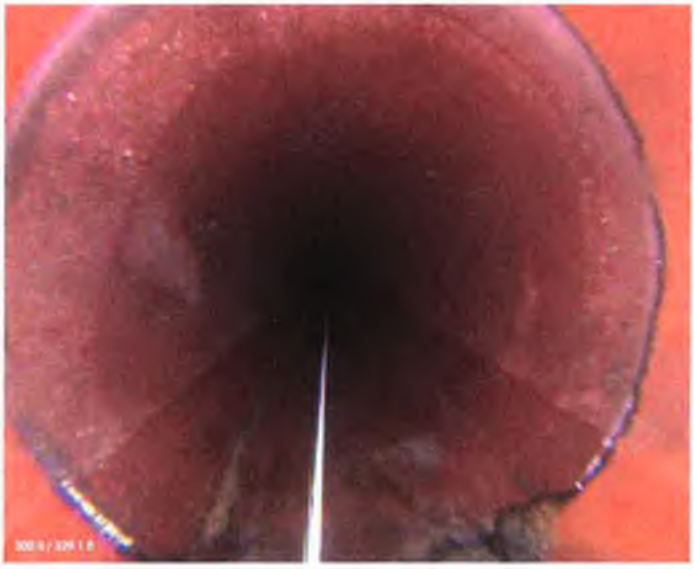
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**0067ed42-5531-49b7-a5c4-74e79670d203_250.4-MGP.jpg**		
Distance (ft):	**250.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**SSS**		
Description:	**Surface Spalling**		
Image Name:	**57baaf5d-9dc1-4b12-98da-87194e356dcf_252-SSS.jpg**		
Distance (ft):	**252**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**TFA**		
Description:	**Tap Factory Active**		
Image Name:	**654255cd-1503-4df4-b937-8160bdec9462_269.3-TFA.jpg**		
Distance (ft):	**269.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

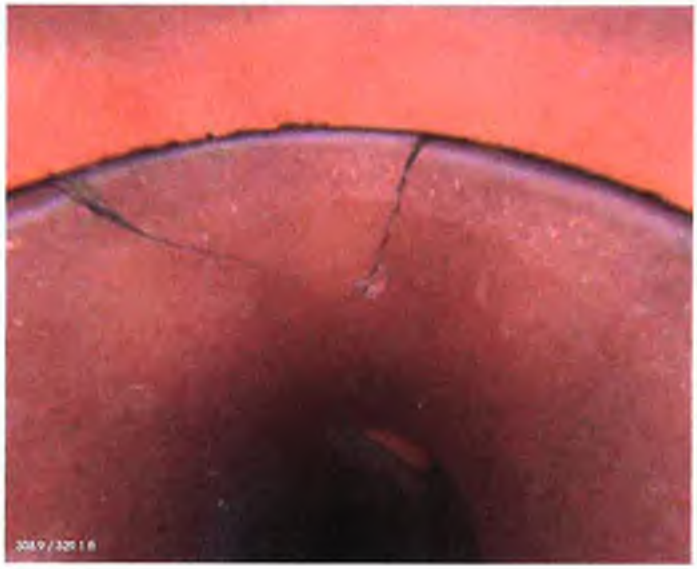


PACP Code:	TFA		
Description:	Tap Factory Active		
Image Name:	412daabc-b807-4dbb-9819-a5db6560a815_287-TFA.jpg		
Distance (ft):	287		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	MGP		
Description:	General Photo		
Image Name:	26f01eef-b3ea-46eb-8816-03ff210f6345_300-MGP.jpg		
Distance (ft):	300		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	e9f27d9f-6767-4eda-8d20-32ddfd4974a4_308-TB.jpg		
Distance (ft):	308		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**fc395e94-4e16-49fb-bf78-541bc1a9c102_308.9-FM.jpg**		
Distance (ft):	**308.9**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**babc2810-fa41-4fb9-bcc3-8babe52f8af3_329.1-AMH.jpg**		
Distance (ft):	**329.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1018 to 07-1009	07-1018	07-1009	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		168	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	01:46 PM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		168
Media Label	Reverse Setup	Work Order No	Additional Info	
NS6-1467	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
19	18	1
Overall Index	Structural Index	Maintenance Index
3.17	3.6	1
Overall Quick	Structural Quick	Maintenance Quick
4332	4332	1100

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 5% of cross sectional area (5%)
4	0.2	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint MH → J2.5 WL 10%
3	11.7	[CM] Crack Multiple from 11 to 1 o'clock within 8" of joint J11.5 to 14.5
4	17.7	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint J17.5 to 20.5 WL = 10%
-	50.3	[MGP] General Photo WL = 10%
-	69	[MWL] Water Level 50% of cross sectional area (50%) J60 to 78.5
4	69.3	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint
1	77	[VC] Vermin Cockroach NOT within 8" of joint
-	78.9	[MWL] Water Level 10% of cross sectional area (10%)
-	100.3	[MGP] General Photo
-	145.4	[MWL] Water Level 50% of cross sectional area 50% J142 to 157.5
3	148.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	150.4	[MGP] General Photo
-	167.9	[AMH] Manhole Remarks: End of survey

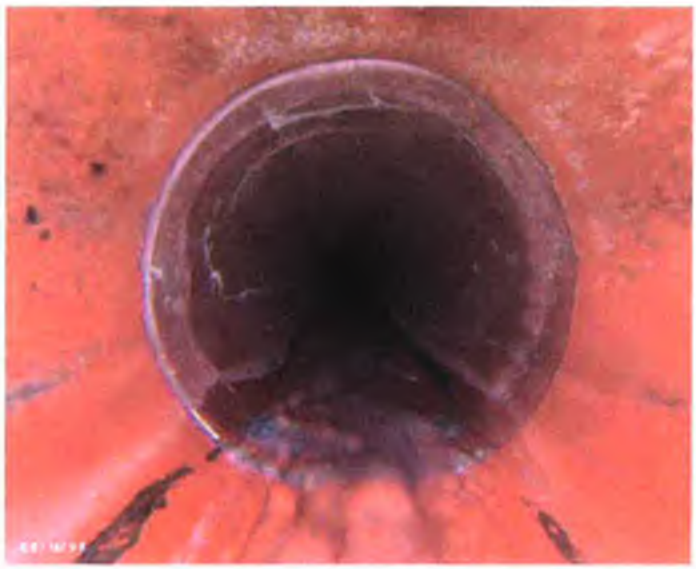
07-1018

Camera Direction

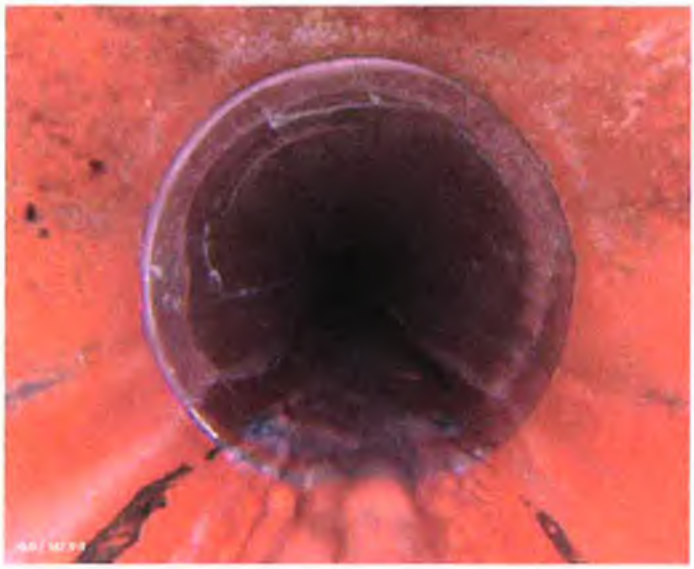
07-1009

Condition Observations:

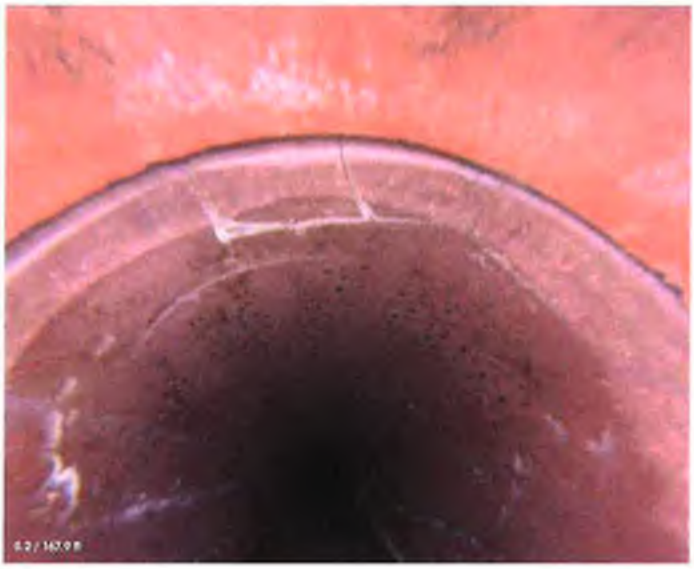
Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	5% of cross sectional area				5	☐		
4	0.2	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
3	11.7	CM	Crack Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
4	17.7	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	50.3	MGP	General Photo						☐		
-	69	MWL	Water Level	50% of cross sectional area				50	☐		
4	69.3	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
1	77	VC	Vermin Cockroach	NOT within 8" of joint					☐		
-	78.9	MWL	Water Level	10% of cross sectional area				10	☐		
-	100.3	MGP	General Photo						☐		
-	145.4	MWL	Water Level	50% of cross sectional area				50	☐		
3	148.4	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	150.4	MGP	General Photo						☐		
-	167.9	AMH	Manhole	Remarks: End of survey					☐		



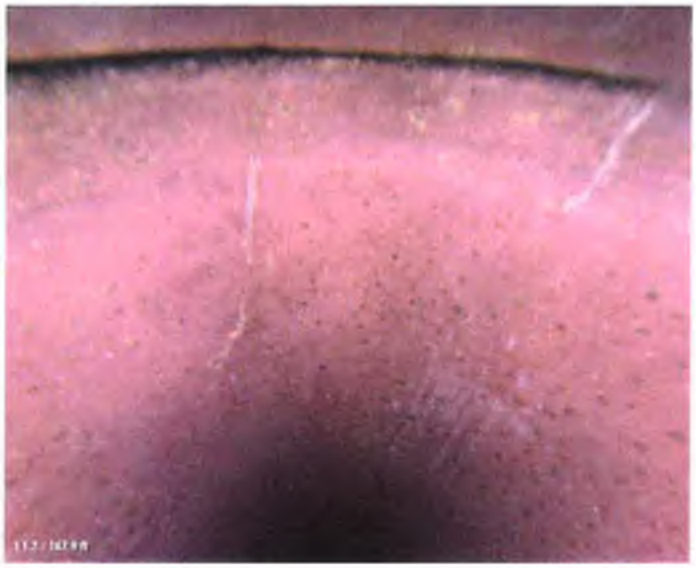
PACP Code:	AMH		
Description:	Manhole		
Image Name:	21746b0d-42f3-4a77-83a4-e3d5f6f1c270_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		



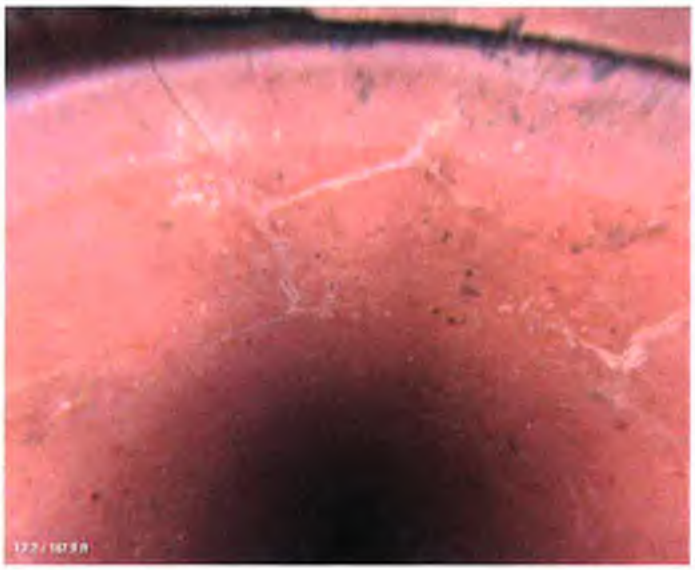
PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**0fff4e76-0a37-4713-99a8-9c1cf0184dc8_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**5**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**e2946324-87bf-473b-ace1-71dfccf6a0cb_0.2-FM.jpg**		
Distance (ft):	**0.2**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**d7173e66-2948-4d78-afa6-ed8b75b19d73_11.7-CM.jpg**		
Distance (ft):	**11.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**f381960d-3405-4315-aaa4-484167d2cb2c_17.7-FM.jpg**		
Distance (ft):	**17.7**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**f5139e89-5def-4ad0-a8b6-bf3ec34ea0aa_50.3-MGP.jpg**		
Distance (ft):	**50.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**963d22ca-9e1e-42ec-8fae-f198b6ff101b_69-MWL.jpg**		
Distance (ft):	**69**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**50**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

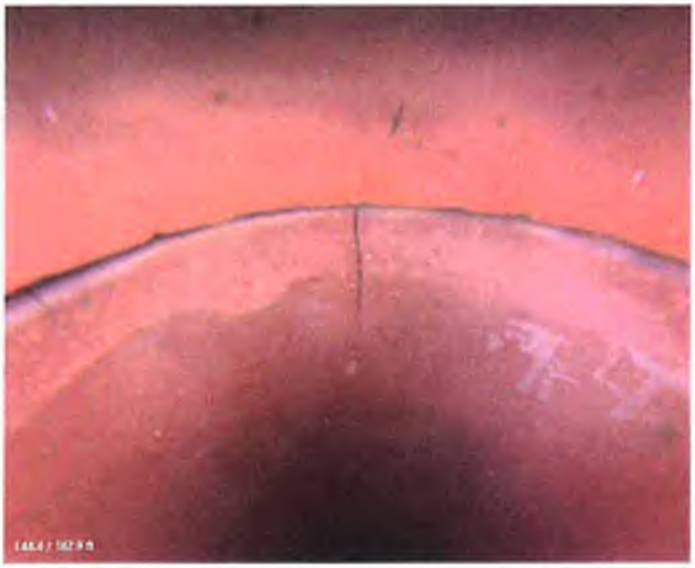
PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	e6336c7c-fbea-4a8a-9850-c519639b4806_69.3-FM.jpg		
Distance (ft):	69.3		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	1
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	VC		
Description:	Vermin Cockroach		
Image Name:	48a3900c-c661-4364-ae73-01626e1e4359_77-VC.jpg		
Distance (ft):	77		
Structural Grade:	0	Maintenance Grade	1
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	e739971d-d5c1-4d79-9a13-ec26748c50a3_78.9-MWL.jpg		
Distance (ft):	78.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

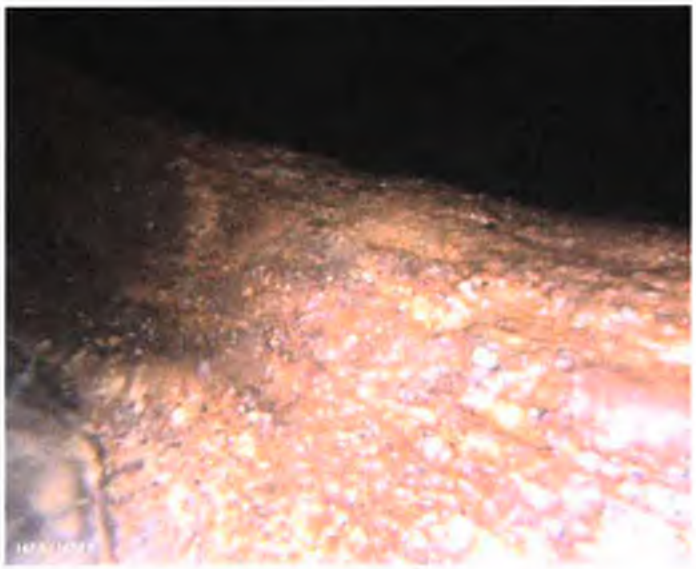
PACP Code:	MGP		
Description:	General Photo		
Image Name:	3833cc31-6888-4f5c-93bd-39398fc9f58d_100.3-MGP.jpg		
Distance (ft):	100.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	e8ffe0e1-800d-4c97-bd05-9c7acdf7aa96_145.4-MWL.jpg		
Distance (ft):	145.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	50		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	84cc2743-2c78-4218-b227-5e7876eaebb0_148.4-FL.jpg		
Distance (ft):	148.4		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**f0ff8d92-8c95-4441-bee7-d2d7adeb93ab_150.4-MGP.jpg**		
Distance (ft):	**150.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**c270d291-6489-44cc-a00c-cacb154ea149_167.9-AMH.jpg**		
Distance (ft):	**167.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1019 to 07-1018	07-1019	07-1018	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		323	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	12:48 PM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		323
Media Label	Reverse Setup	Work Order No	Additional Info	
NS15-1533	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
21	20	1
Overall Index	Structural Index	Maintenance Index
3	3.33	1
Overall Quick	Structural Quick	Maintenance Quick
4234	4234	1100

Recommendation

Spot Repair (64ft) —> J119.5-153, J292.5 - MH

CIPP Lining MH - J1.5, J92.5 - 95.5, J 95.5 - 101.5

J 125.5 - 128.5, J141 - 144, J 159 - 162

Grade	Dist (ft)	Observation
		07-1019
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 10% of cross sectional area (10%)
3	1.5	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint MH - J1.5 (1.5)
-	47.6	[MWL] Water Level 25% of cross sectional area (25%)
-	50.9	[MGP] General Photo
3	95.1	[FL] Fracture Longitudinal at 4 o'clock within 8" of joint J92.5 - 95.5 (3)
4	98.2	[FM] Fracture Multiple from 9 to 3 o'clock within 8" of joint J 95.5 - 98.5 J98.5 - 101.5
-	100.5	[MGP] General Photo (6)
-	122.7	[MWL] Water Level 25% of cross sectional area (25%)
3	125.8	[CM] Crack Multiple from 10 to 2 o'clock within 8" of joint J125.5 - 128.5 (3)
1	126.1	[VC] Vermin Cockroach NOT within 8" of joint
3	141	[CM] Crack Multiple from 11 to 1 o'clock within 8" of joint J141 - 144 (3)
-	150	[MGP] General Photo
-	158.1	[MWL] Water Level 10% of cross sectional area
4	159.1	[FM] Fracture Multiple from 12 to 2 o'clock within 8" of joint J159 - 162 (3)
-	163.3	[MWL] Water Level 5% of cross sectional area (5%)
-	180	[MWL] Water Level 15% of cross sectional area (15%)
-	200.8	[MGP] General Photo
-	249.6	[MWL] Water Level 30% of cross sectional area
-	250.2	[MGP] General Photo
-	263.9	[MWL] Water Level 10% of cross sectional area
-	270.3	[MWL] Water Level 5% of cross sectional area
-	283.7	[MWL] Water Level 15% of cross sectional area
-	296.6	[MWL] Water Level 30% of cross sectional area
-	300	[MGP] General Photo
-	322.7	[AMH] Manhole Remarks: End of survey
		07-1018

Camera Direction

Spot Repair { J119.5 - 153 → Water Sag ~25%
J292.5 - MH DS

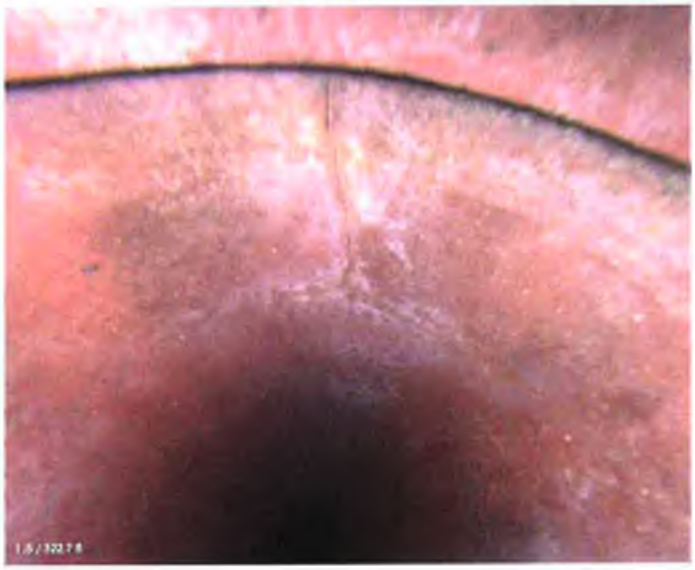
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	10% of cross sectional area				10	☐		
3	1.5	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	47.6	MWL	Water Level	25% of cross sectional area				25	☐		
-	50.9	MGP	General Photo						☐		
3	95.1	FL	Fracture Longitudinal	at 4 o'clock within 8" of joint					☑	4	
4	98.2	FM	Fracture Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3
-	100.5	MGP	General Photo						☐		
-	122.7	MWL	Water Level	25% of cross sectional area				25	☐		

3	125.8	CM	Crack Multiple	from 10 to 2 o'clock within 8" of joint					☑	10	2
1	126.1	VC	Vermin Cockroach	NOT within 8" of joint					☐		
3	141	CM	Crack Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	150	MGP	General Photo						☐		
-	158.1	MWL	Water Level	10% of cross sectional area				10	☐		
4	159.1	FM	Fracture Multiple	from 12 to 2 o'clock within 8" of joint					☑	12	2
-	163.3	MWL	Water Level	5% of cross sectional area				5	☐		
-	180	MWL	Water Level	15% of cross sectional area				15	☐		
-	200.8	MGP	General Photo						☐		
-	249.6	MWL	Water Level	30% of cross sectional area				30	☐		
-	250.2	MGP	General Photo						☐		
-	263.9	MWL	Water Level	10% of cross sectional area				10	☐		
-	270.3	MWL	Water Level	5% of cross sectional area				5	☐		
-	283.7	MWL	Water Level	15% of cross sectional area				15	☐		
-	296.6	MWL	Water Level	30% of cross sectional area				30	☐		
-	300	MGP	General Photo						☐		
-	322.7	AMH	Manhole	Remarks: End of survey					☐		

PACP Code:	AMH		
Description:	Manhole		
Image Name:	bc2a1359-cc26-4c45-b2f9-168cd1299b38_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

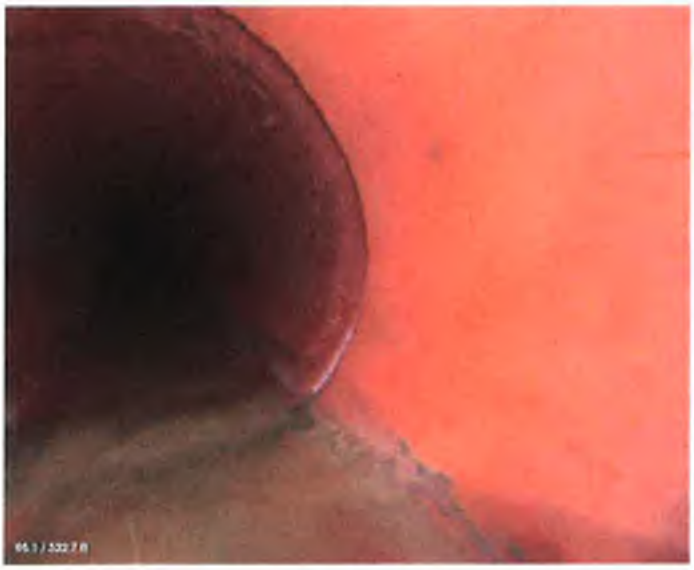
PACP Code:	MWL		
Description:	Water Level		
Image Name:	496a99c8-9057-4854-9317-417a9c2b077f_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



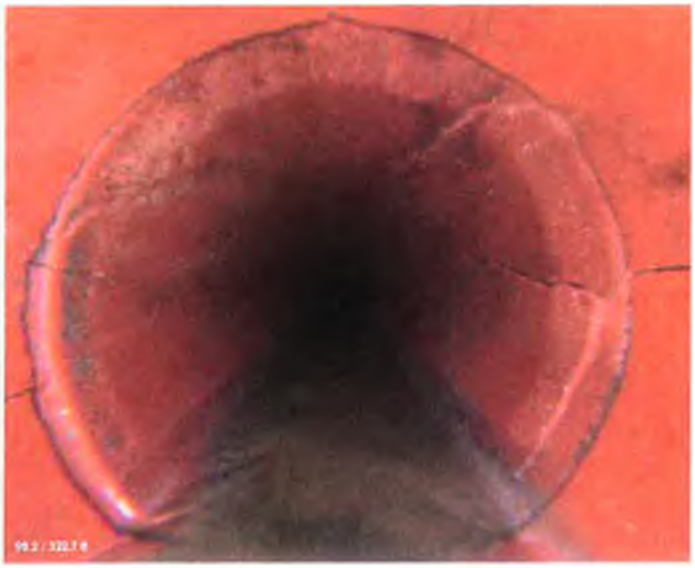
PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	47c23089-bfa9-4bd7-9ee4-348c15faf04f_1.5-FL.jpg		
Distance (ft):	1.5		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	ad14e9f8-c65e-40e4-a198-0cad951807d6_47.6-MWL.jpg		
Distance (ft):	47.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	25		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**aba9d8bf-89fb-46c9-9742-3bda01270f8f_50.9-MGP.jpg**		
Distance (ft):	**50.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**33c5afa5-5a80-48e7-aa09-0c659c33804c_95.1-FL.jpg**		
Distance (ft):	**95.1**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**4**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**9d88bc22-582b-408e-827d-724bb742179f_98.2-FM.jpg**		
Distance (ft):	**98.2**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**1a675ec3-cae6-4d43-a2fb-810b5df6826e_100.5-MGP.jpg**		
Distance (ft):	**100.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**82461e4a-46c2-4fbe-b128-d6d0a24fae8e_122.7-MWL.jpg**		
Distance (ft):	**122.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**25**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**4cd572e0-780f-4983-8148-d29651173396_125.8-CM.jpg**		
Distance (ft):	**125.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**VC**		
Description:	**Vermin Cockroach**		
Image Name:	**13a9085e-32a7-44af-bed5-7598bf7a3255_126.1-VC.jpg**		
Distance (ft):	**126.1**		
Structural Grade:	**0**	Maintenance Grade	**1**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**28ae45dc-f487-4eed-b0fb-8a1767a6e8b1_141-CM.jpg**		
Distance (ft):	**141**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**78b6580d-2863-4689-9e4a-6a26d71d02d0_150-MGP.jpg**		
Distance (ft):	**150**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	731abea3-e924-4921-a548-9f9378d6a6c8_158.1-MWL.jpg		
Distance (ft):	158.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	02186c0a-c260-4017-b617-5e8698d4b96f_159.1-FM.jpg		
Distance (ft):	159.1		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	2
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	b1b9f897-460d-4b57-8d39-68eb4962be8f_163.3-MWL.jpg		
Distance (ft):	163.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	9e607123-7b7b-4579-8778-c8de6b0f248f_180-MWL.jpg		
Distance (ft):	180		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	15		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	5b4b4242-bb0c-4ff3-94c6-815db2a128a0_200.8-MGP.jpg		
Distance (ft):	200.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	2e00ab60-ff60-425d-8f13-698132a2cb1d_249.6-MWL.jpg		
Distance (ft):	249.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	30		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	fd9425c8-c955-43b7-9f10-4f3604ba98a0_250.2-MGP.jpg		
Distance (ft):	250.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	e00d6467-482d-4e30-bfaf-2afda22494fe_263.9-MWL.jpg		
Distance (ft):	263.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	fb109253-da98-4067-b1be-56620e3cf78e_270.3-MWL.jpg		
Distance (ft):	270.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	682cf1e6-9d8c-4013-8de1-9d4bee0526ff_283.7-MWL.jpg		
Distance (ft):	283.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	15		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	8232e00e-6b08-4e10-9fc2-53d1e809027b_296.6-MWL.jpg		
Distance (ft):	296.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	30		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	313f51ba-c0b4-4458-a48f-bf08fd324d56_300-MGP.jpg		
Distance (ft):	300		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**aff62e4f-3a73-486d-80e6-e7c6e1774fd6_322.7-AMH.jpg**		
Distance (ft):	**322.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1020 to 07-1019	07-1020	07-1019	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		0	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	12:47 PM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		383
Media Label	Reverse Setup	Work Order No	Additional Info	
NS23-1470	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
12	8	4
Overall Index	Structural Index	Maintenance Index
3	4	2
Overall Quick	Structural Quick	Maintenance Quick
4231	4200	3111

- high water level consistently throughout the length of the pipe
- various cracks and fractures

Recommendation

① Open Trench Pipe Replacement (400ft)

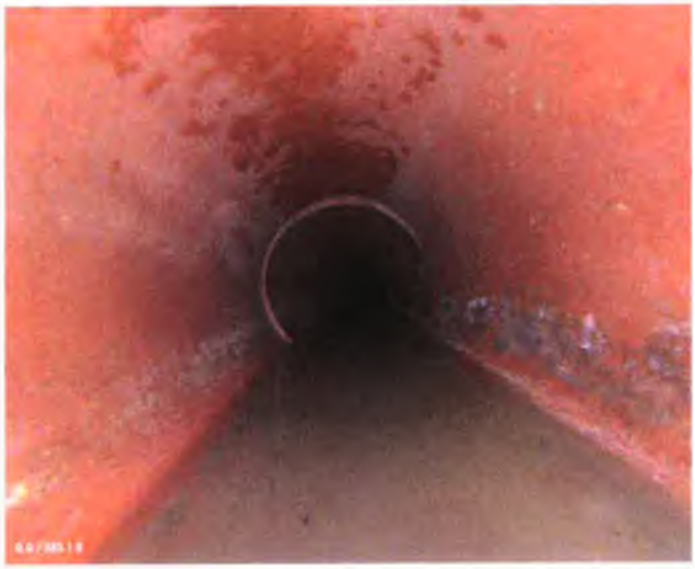
Grade	Dist (ft)	Observation
		07-1019
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 25% of cross sectional area (25%)
4	12.4	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint @ 512
-	15.5	[MWL] Water Level 40% of cross sectional area (40%)
-	32.5	[TF] Tap Factory at 2 o'clock
-	38.1	[TF] Tap Factory at 10 o'clock
-	50.7	[MGP] General Photo 25% WL
-	84.2	[TF] Tap Factory at 2 o'clock 40% WL
-	99	[TF] Tap Factory at 10 o'clock
-	100	[MGP] General Photo
1	112.4	[VC] Vermin Cockroach NOT within 8" of joint 40% WL
-	135.5	[TF] Tap Factory at 2 o'clock 30% WL
4	136.5	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint 40% WL
-	150.5	[MGP] General Photo
-	162.8	[TF] Tap Factory at 10 o'clock
-	187.1	[TF] Tap Factory at 2 o'clock 50% WL
-	200.3	[MGP] General Photo 40% WL
-	226.5	[TF] Tap Factory at 10 o'clock
-	241.4	[TF] Tap Factory at 2 o'clock
-	250.3	[MGP] General Photo
-	287.1	[TF] Tap Factory at 10 o'clock
-	289.8	[TF] Tap Factory at 2 o'clock
-	300	[MGP] General Photo
-	341.9	[TF] Tap Factory at 2 o'clock
-	350.5	[TF] Tap Factory at 10 o'clock
-	350.5	[MGP] General Photo
3	351.1	[TBI] Tap Break-in Intruding at 2 o'clock NOT within 8" of joint
-	383.1	[MSA] Abandoned Survey Remarks: Unknown
		07-1020

Camera Direction

Condition Observations:

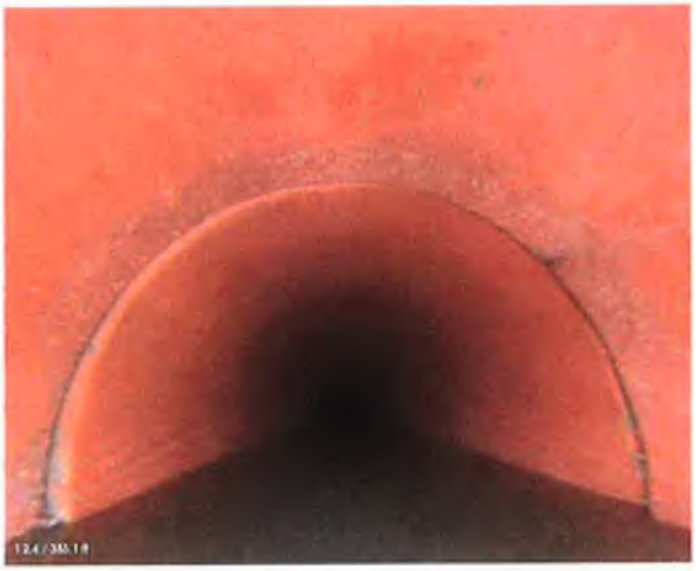
Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	25% of cross sectional area				25	☐		
4	12.4	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint					☑	10	2
-	15.5	MWL	Water Level	40% of cross sectional area				40	☐		
-	32.5	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	38.1	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	50.7	MGP	General Photo						☐		

-	84.2	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	99	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	100	MGP	General Photo						☐		
1	112.4	VC	Vermin Cockroach	NOT within 8" of joint					☐		
-	135.5	TF	Tap Factory	at 2 o'clock		4			☐	2	
4	136.5	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint					☑	10	2
-	150.5	MGP	General Photo						☐		
-	162.8	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	187.1	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	200.3	MGP	General Photo						☐		
-	226.5	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	241.4	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	250.3	MGP	General Photo						☐		
-	287.1	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	289.8	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	300	MGP	General Photo						☐		
-	341.9	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	350.5	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	350.5	MGP	General Photo						☐		
3	351.1	TBI	Tap Break-in Intruding	at 2 o'clock NOT within 8" of joint		4	2		☐	2	
-	383.1	MSA	Abandoned Survey	Remarks: Unknown					☐		



PACP Code:	AMH		
Description:	Manhole		
Image Name:	3cf8b98d-376f-40f3-b7d0-382dc8df2611_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

PACP Code:	MWL		
Description:	Water Level		
Image Name:	c0575091-9f2a-451d-8f60-612f69660c35_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	25		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



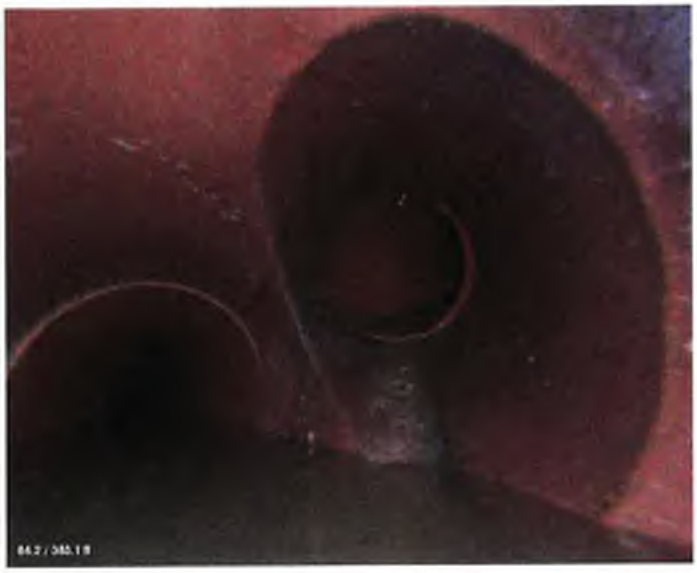
PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	68122928-3aad-4965-bf41-8dcd81669593_12.4-FM.jpg		
Distance (ft):	12.4		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	2
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	9c6c1dff-3bb2-4d84-bb30-6ae88be98923_15.5-MWL.jpg		
Distance (ft):	15.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	40		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

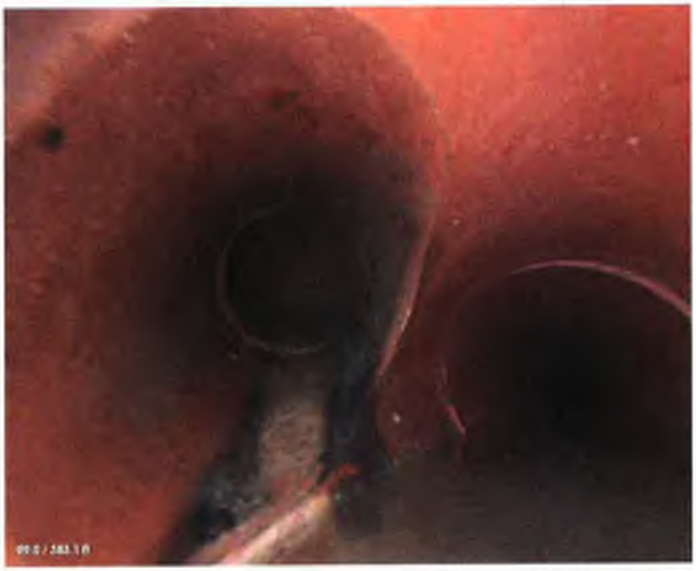
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	8b01dcb7-5176-4955-8175-b3179dbcb8e7_32.5-TF.jpg		
Distance (ft):	32.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	bfe03b31-cae6-415a-82cb-653f535281ab_38.1-TF.jpg		
Distance (ft):	38.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	2b1aa259-6646-4d3b-85b9-f1f9f94ade4d_50.7-MGP.jpg		
Distance (ft):	50.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



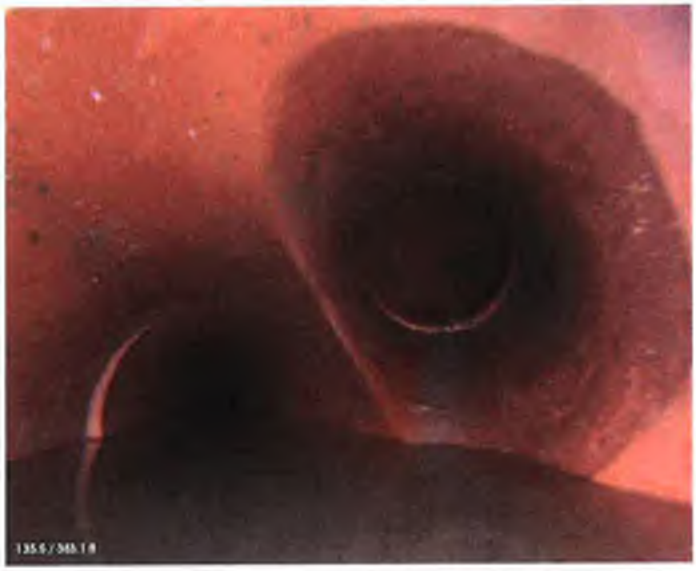
PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**e4692a8e-9ba9-4185-afe2-1d62b246dc3a_84.2-TF.jpg**		
Distance (ft):	**84.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**cefdf5bb-dba2-466e-ae07-e634dee8e632_99-TF.jpg**		
Distance (ft):	**99**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**e1248f78-a0dc-40cb-ac30-500f4064f41c_100-MGP.jpg**		
Distance (ft):	**100**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

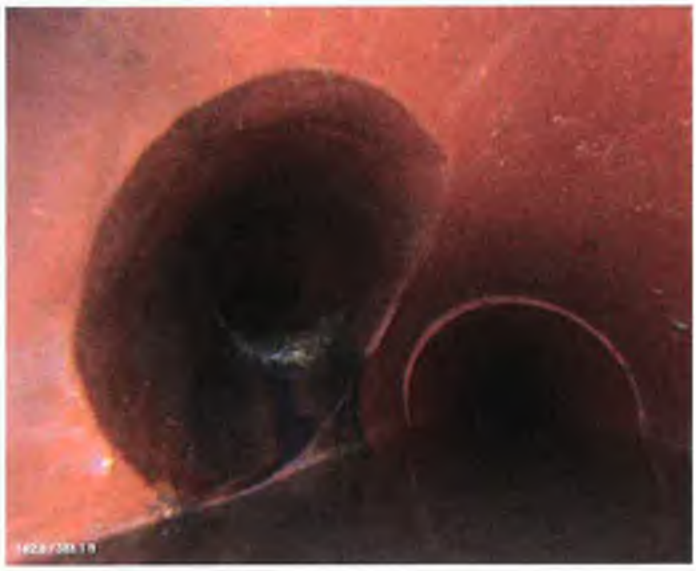
PACP Code:	VC		
Description:	**Vermin Cockroach**		
Image Name:	**0bb020c5-3e05-4e13-bb92-a3ea7d47ffbd_112.4-VC.jpg**		
Distance (ft):	**112.4**		
Structural Grade:	**0**	Maintenance Grade	**1**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**54d1719a-68a6-434d-8ec3-0f86622f9f88_135.5-TF.jpg**		
Distance (ft):	**135.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**249c13d1-b41c-4b83-a9f9-fd75178b0d78_136.5-FM.jpg**		
Distance (ft):	**136.5**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

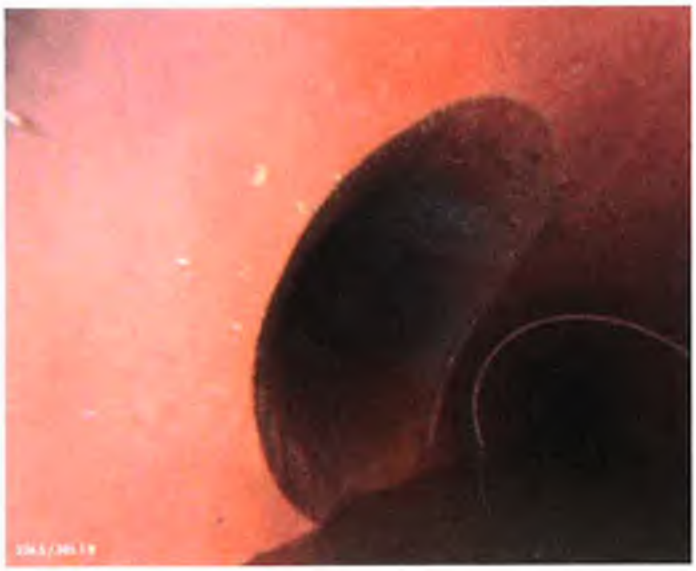
PACP Code:	MGP		
Description:	General Photo		
Image Name:	ac149550-0141-4000-b2cd-2b696070f923_150.5-MGP.jpg		
Distance (ft):	150.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	Tap Factory		
Image Name:	90f0a665-9dc7-46ca-8a61-959d4fd676ac_162.8-TF.jpg		
Distance (ft):	162.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	feb0fc70-a759-4a01-b744-21b5156a7637_187.1-TF.jpg		
Distance (ft):	187.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**61d3a018-8f22-4437-b025-77aab079610e_200.3-MGP.jpg**		
Distance (ft):	**200.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

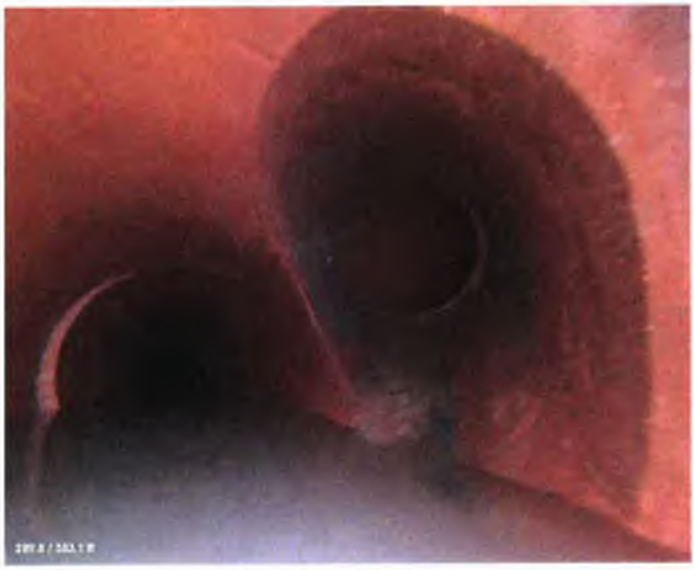


PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**698c3094-d325-4b16-a4d3-0cf215be7c84_226.5-TF.jpg**		
Distance (ft):	**226.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

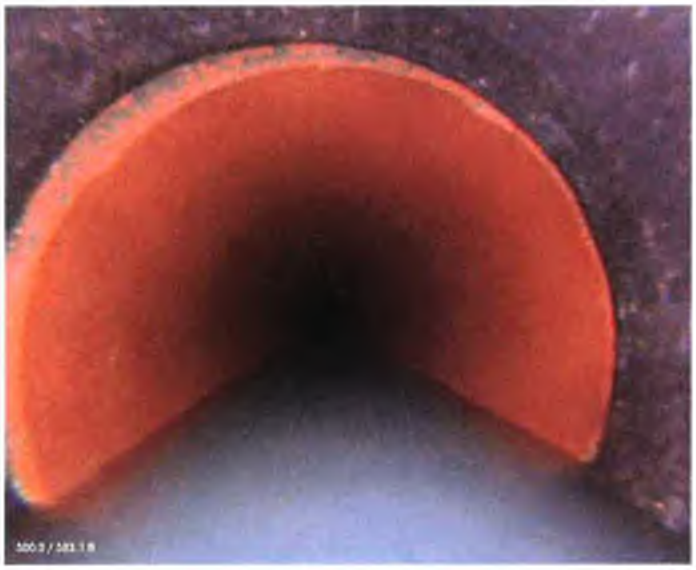
PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**c23d574e-bdd8-48a0-a775-5e389d117031_241.4-TF.jpg**		
Distance (ft):	**241.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	3d59c197-65a5-49cb-9616-161781f98e43_250.3-MGP.jpg		
Distance (ft):	250.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	ccca3f61-812c-46f6-91d0-a56475d3bbf4_287.1-TF.jpg		
Distance (ft):	287.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

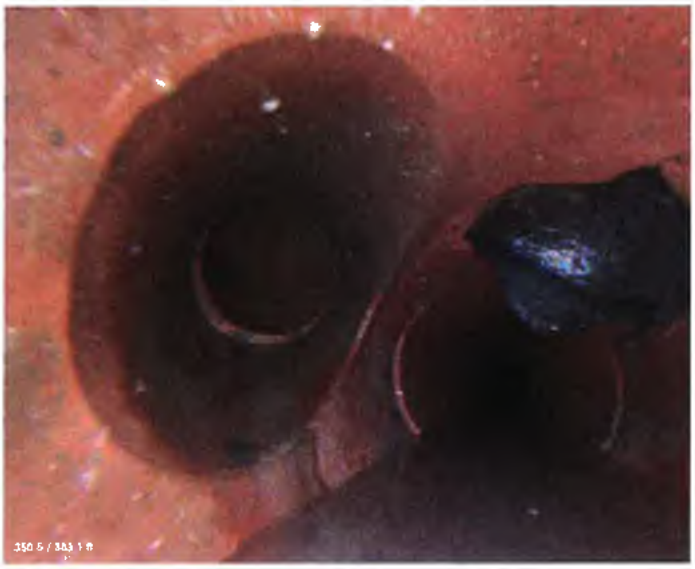


PACP Code:	TF		
Description:	Tap Factory		
Image Name:	4eb9e65e-7640-4f4e-ae4b-7ed0ede82c4f_289.8-TF.jpg		
Distance (ft):	289.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

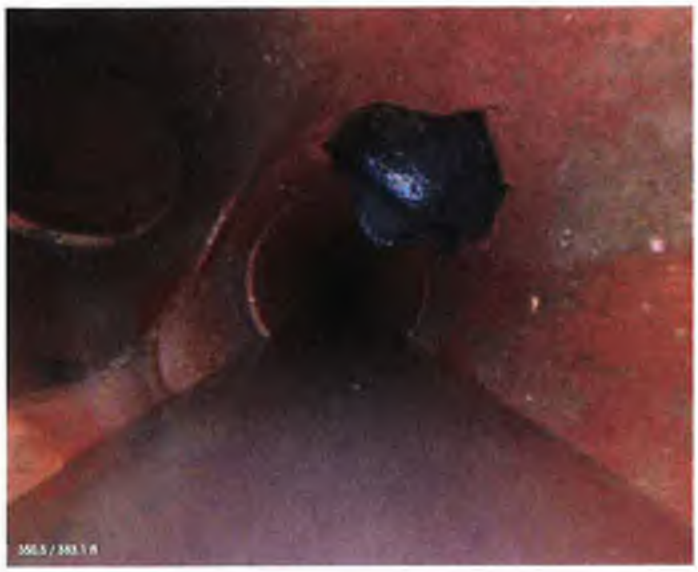


PACP Code:	MGP		
Description:	General Photo		
Image Name:	187de02d-c52f-4dda-a87d-b656dac1dad9_300-MGP.jpg		
Distance (ft):	300		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	3220ab58-510c-4d03-9253-f463cba6671b_341.9-TF.jpg		
Distance (ft):	341.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	Tap Factory		
Image Name:	a9892f5d-9311-4107-a9f7-cfad9d84f21b_350.5-TF.jpg		
Distance (ft):	350.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	MGP		
Description:	General Photo		
Image Name:	cc3fdfc5-bc36-4837-ab8c-8c8af70d2063_350.5-MGP.jpg		
Distance (ft):	350.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TBI		
Description:	Tap Break-in Intruding		
Image Name:	1e64aa91-04c5-4c0d-8293-8eb96d1bd32f_351.1-TBI.jpg		
Distance (ft):	351.1		
Structural Grade:	0	Maintenance Grade	3
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	2
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MSA		
Description:	Abandoned Survey		
Image Name:	f6f073f6-d028-4d6d-8f6a-ea61896e2460_383.1-MSA.jpg		
Distance (ft):	383.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Unknown		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1021 to 07-1020	07-1021	07-1020	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		400	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	12:30 PM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		400
Media Label	Reverse Setup	Work Order No	Additional Info	
NS22-918	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
23	23	0
Overall Index	Structural Index	Maintenance Index
2.56	2.56	0
Overall Quick	Structural Quick	Maintenance Quick
4231	4231	0000

- pipe condition good
- various cracks and fractures @ joints

Recommendation

CIPP Lining (275+) * various spots

07-1021

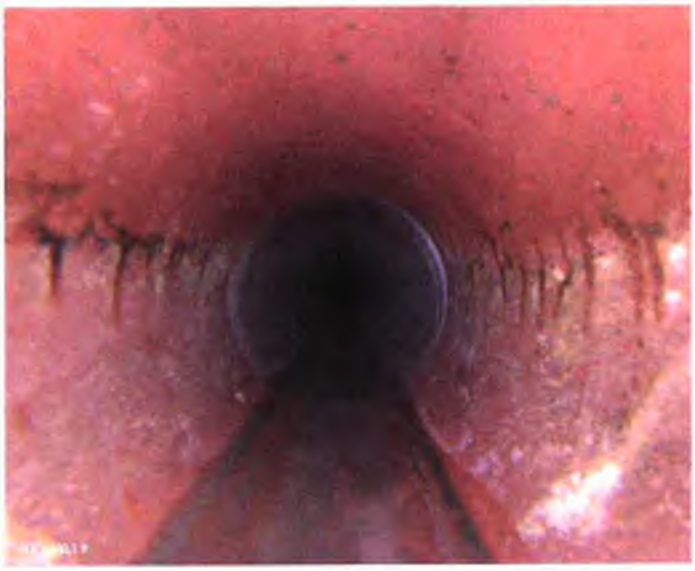
Camera Direction

Grade	Dist (ft)	Observation		
-	0	[AMH] Manhole Remarks: Begin survey		
-	0	[MWL] Water Level 5% of cross sectional area	(5%)	
-	5.9	[TF] Tap Factory at 9 o'clock		
-	22.5	[MWL] Water Level 20% of cross sectional area	(20%)	
-	48.5	[TF] Tap Factory at 10 o'clock		
-	50.2	[MGP] General Photo		
2	62.9	[SSS] Surface Spalling at 9 o'clock within 8" of joint	J63 - 66	3
-	69.6	[TFA] Tap Factory Active at 3 o'clock		
-	96.8	[TF] Tap Factory at 10 o'clock		
4	98.5	[FM] Fracture Multiple from 1 to 5 o'clock within 8" of joint	J99 - 102	3
-	100.6	[MGP] General Photo		
-	136.3	[TFA] Tap Factory Active at 3 o'clock		
-	142.1	[MWL] Water Level 10% of cross sectional area	(10%)	
-	150.2	[MGP] General Photo		
-	150.9	[TF] Tap Factory at 9 o'clock		
-	198.4	[TB] Tap Break-in at 11 o'clock		
-	199.4	[TF] Tap Factory at 3 o'clock		
-	200.2	[MGP] General Photo		
-	202.1	[TF] Tap Factory at 10 o'clock		
-	250.1	[MGP] General Photo		
2	252.8	[SSS] Surface Spalling at 1 o'clock within 8" of joint	J253 to J256	3
-	253.4	[TFA] Tap Factory Active at 10 o'clock		
-	262.3	[TF] Tap Factory at 3 o'clock		
2	267.1	[SSS] Surface Spalling from 9 to 10 o'clock within 8" of joint	J267 - 270	3
-	274.3	[MWL] Water Level 20% of cross sectional area	(20%)	
-	300	[MGP] General Photo		
-	304.7	[TF] Tap Factory at 10 o'clock		
-	306	[MWL] Water Level 10% of cross sectional area	(10%)	
2	309.8	[SSS] Surface Spalling from 9 to 10 o'clock within 8" of joint	J310 to 313	3
-	322.5	[TF] Tap Factory at 3 o'clock		
2	337	[SSS] Surface Spalling at 9 o'clock within 8" of joint	J337 to 340	3
-	350.5	[MGP] General Photo	WL = 10%	
-	352.8	[TF] Tap Factory at 10 o'clock		
3	354.9	[FL] Fracture Longitudinal at 2 o'clock within 8" of joint	J255 - 258	3
4	361	[FM] Fracture Multiple from 8 to 9 o'clock within 8" of joint	J261 to 264	3
2	367.1	[SSS] Surface Spalling from 9 to 11 o'clock within 8" of joint	J367 to 370	3
-	386	[TF] Tap Factory at 3 o'clock		
-	400.1	[AMH] Manhole Remarks: End of survey		

07-1020

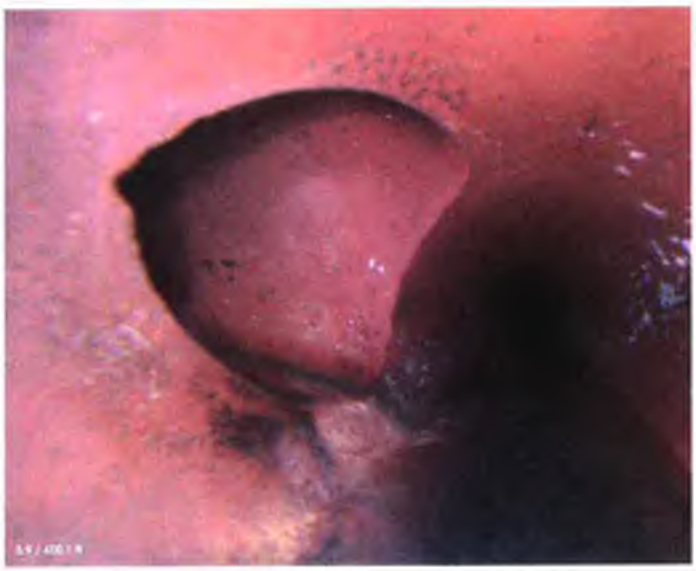
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	5% of cross sectional area				5	☐		
-	5.9	TF	Tap Factory	at 9 o'clock		4			☐	9	
-	22.5	MWL	Water Level	20% of cross sectional area				20	☐		
-	48.5	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	50.2	MGP	General Photo						☐		
2	62.9	SSS	Surface Spalling	at 9 o'clock within 8" of joint					☑	9	
-	69.6	TFA	Tap Factory Active	at 3 o'clock		4			☐	3	
-	96.8	TF	Tap Factory	at 10 o'clock		4			☐	10	
4	98.5	FM	Fracture Multiple	from 1 to 5 o'clock within 8" of joint					☑	1	5
-	100.6	MGP	General Photo						☐		
-	136.3	TFA	Tap Factory Active	at 3 o'clock		4			☐	3	
-	142.1	MWL	Water Level	10% of cross sectional area				10	☐		
-	150.2	MGP	General Photo						☐		
-	150.9	TF	Tap Factory	at 9 o'clock		4			☐	9	
-	198.4	TB	Tap Break-in	at 11 o'clock		4			☐	11	
-	199.4	TF	Tap Factory	at 3 o'clock		4			☐	3	
-	200.2	MGP	General Photo						☐		
-	202.1	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	250.1	MGP	General Photo						☐		
2	252.8	SSS	Surface Spalling	at 1 o'clock within 8" of joint					☑	1	
-	253.4	TFA	Tap Factory Active	at 10 o'clock		4			☐	10	
-	262.3	TF	Tap Factory	at 3 o'clock		4			☐	3	
2	267.1	SSS	Surface Spalling	from 9 to 10 o'clock within 8" of joint					☑	9	10
-	274.3	MWL	Water Level	20% of cross sectional area				20	☐		
-	300	MGP	General Photo						☐		
-	304.7	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	306	MWL	Water Level	10% of cross sectional area				10	☐		
2	309.8	SSS	Surface Spalling	from 9 to 10 o'clock within 8" of joint					☑	9	10
-	322.5	TF	Tap Factory	at 3 o'clock		4			☐	3	
2	337	SSS	Surface Spalling	at 9 o'clock within 8" of joint					☑	9	
-	350.5	MGP	General Photo						☐		
-	352.8	TF	Tap Factory	at 10 o'clock		4			☐	10	
3	354.9	FL	Fracture Longitudinal	at 2 o'clock within 8" of joint					☑	2	
4	361	FM	Fracture Multiple	from 8 to 9 o'clock within 8" of joint					☑	8	9
2	367.1	SSS	Surface Spalling	from 9 to 11 o'clock within 8" of joint					☑	9	11
-	386	TF	Tap Factory	at 3 o'clock		4			☐	3	
-	400.1	AMH	Manhole	Remarks: End of survey					☐		



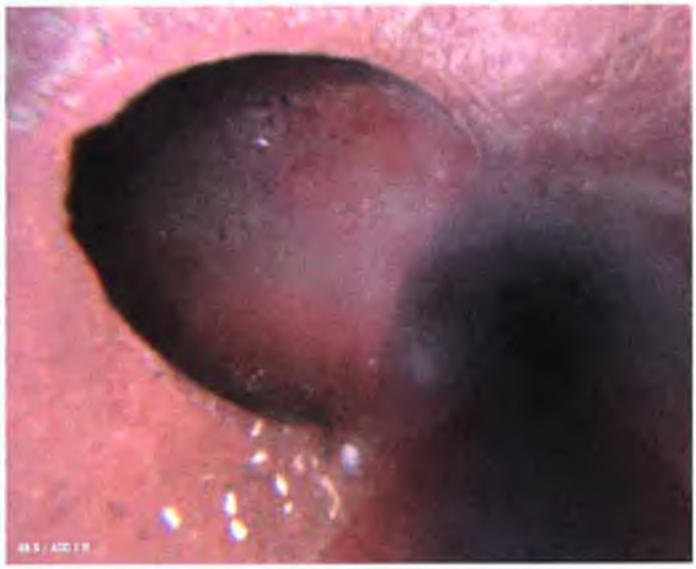
PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**a9e84f48-b357-47c6-93b9-1634dc1f0f6f_0-AMH.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Begin survey**		

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**17b51c49-feda-4378-bd83-a7e53c3dd55c_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**5**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



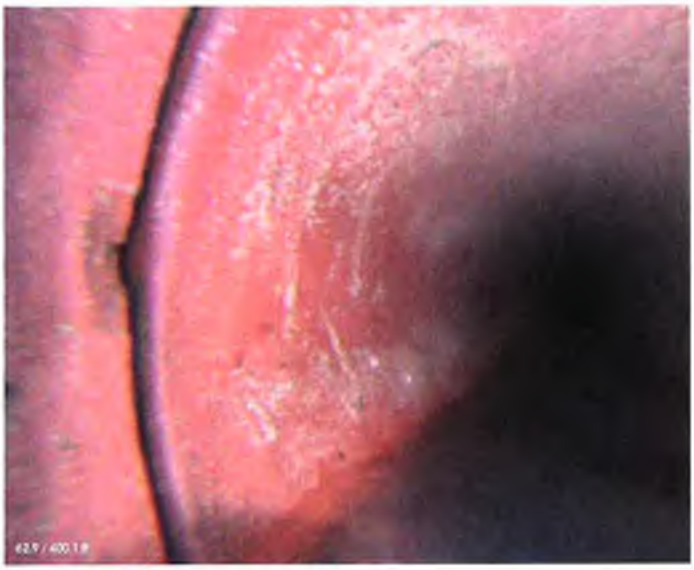
PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**3b27759e-db12-4a6e-8e11-9057b03cbb66_5.9-TF.jpg**		
Distance (ft):	**5.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	21c5eaa3-25d9-4471-8bd3-a3c2fb037f85_22.5-MWL.jpg		
Distance (ft):	22.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	20		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

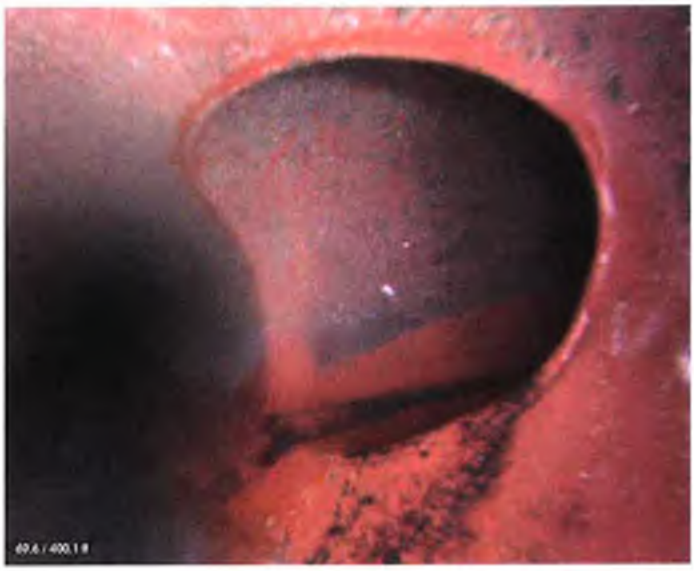


PACP Code:	TF		
Description:	Tap Factory		
Image Name:	83e6b126-f0e3-47d5-9e84-4c4fd20d4c1c_48.5-TF.jpg		
Distance (ft):	48.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

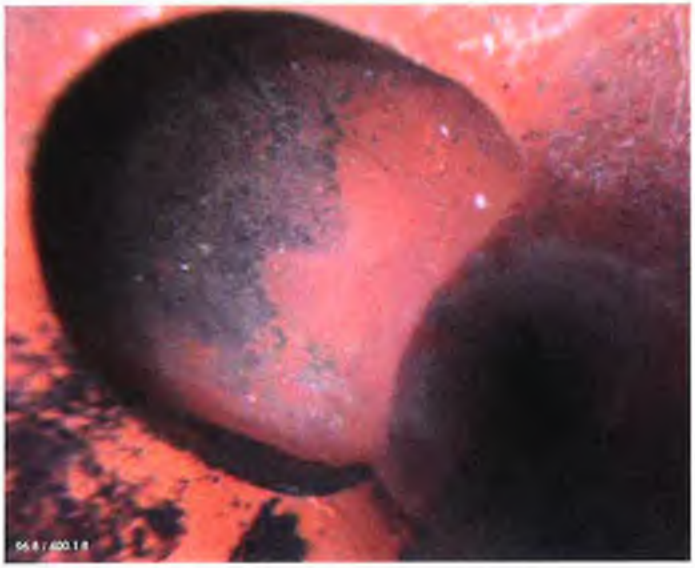
PACP Code:	MGP		
Description:	General Photo		
Image Name:	1be8df83-a780-40fb-b1bf-391da0920dba_50.2-MGP.jpg		
Distance (ft):	50.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



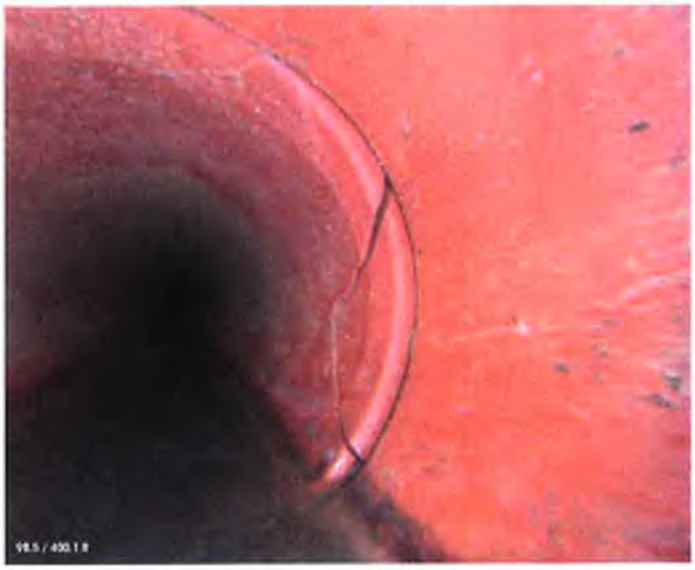
PACP Code:	**SSS**		
Description:	**Surface Spalling**		
Image Name:	**37a43cbf-216b-4585-8ab4-64980d2dc312_62.9-SSS.jpg**		
Distance (ft):	**62.9**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**TFA**		
Description:	**Tap Factory Active**		
Image Name:	**db10dd34-9a8e-44a3-8981-e54e6459d51a_69.6-TFA.jpg**		
Distance (ft):	**69.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**3d05fc66-6a6b-43c5-9650-77445dcff652_96.8-TF.jpg**		
Distance (ft):	**96.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

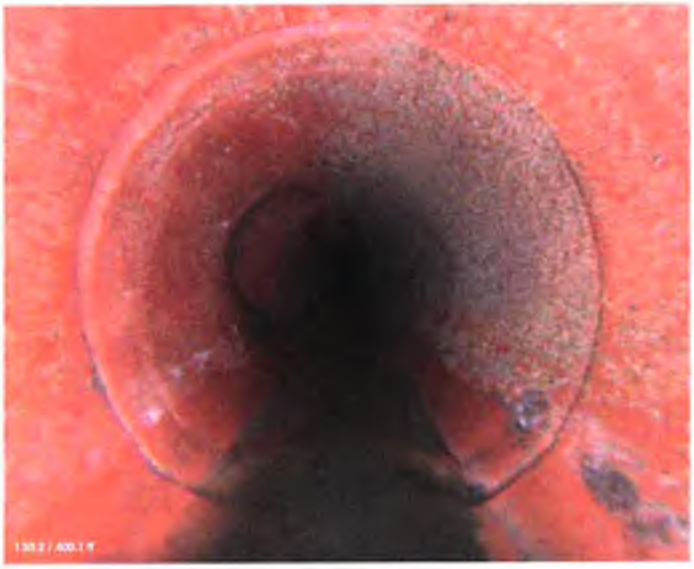


PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**e922cd77-ac84-473c-b001-eb0ffd043399_98.5-FM.jpg**		
Distance (ft):	**98.5**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	**5**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**58b9751d-af05-4f67-bca0-41428add7c0a_100.6-MGP.jpg**		
Distance (ft):	**100.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

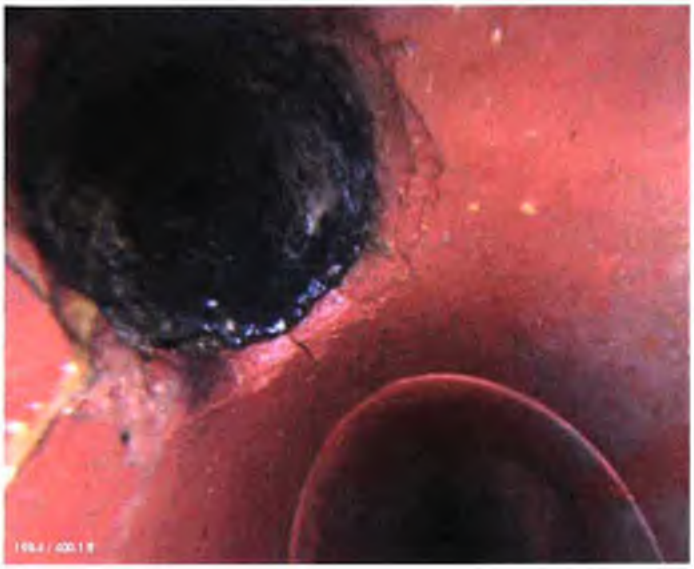
PACP Code:	**TFA**		
Description:	**Tap Factory Active**		
Image Name:	**5fa9bdf3-ff24-4763-9456-9656fe543938_136.3-TFA.jpg**		
Distance (ft):	**136.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	ac4f6d62-61ff-4bc8-8c29-86eb317e71dd_142.1-MWL.jpg		
Distance (ft):	142.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	MGP		
Description:	General Photo		
Image Name:	f8520fde-2287-412b-8e0c-b8ee8e205ab5_150.2-MGP.jpg		
Distance (ft):	150.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	a9ec2529-00d0-457d-b7a0-9b1e3c07a9b4_150.9-TF.jpg		
Distance (ft):	150.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	9	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



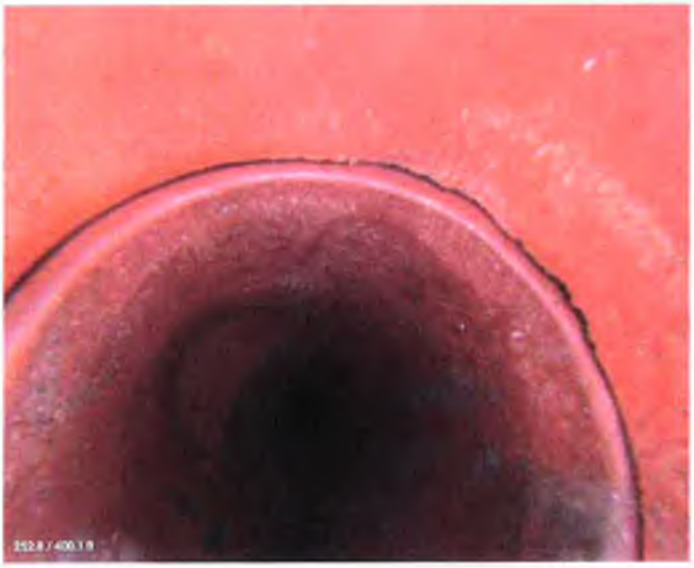
PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	e7e281e0-5557-4e10-a270-d00097b3e2aa_198.4-TB.jpg		
Distance (ft):	198.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	028031f9-17fe-4d54-9762-83d2df57e004_199.4-TF.jpg		
Distance (ft):	199.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	3	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	93d4af48-2401-4cbf-8672-cbd93ab5c364_200.2-MGP.jpg		
Distance (ft):	200.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**9df36ffa-f01a-4919-a9b6-1b9752dc7c17_202.1-TF.jpg**		
Distance (ft):	**202.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

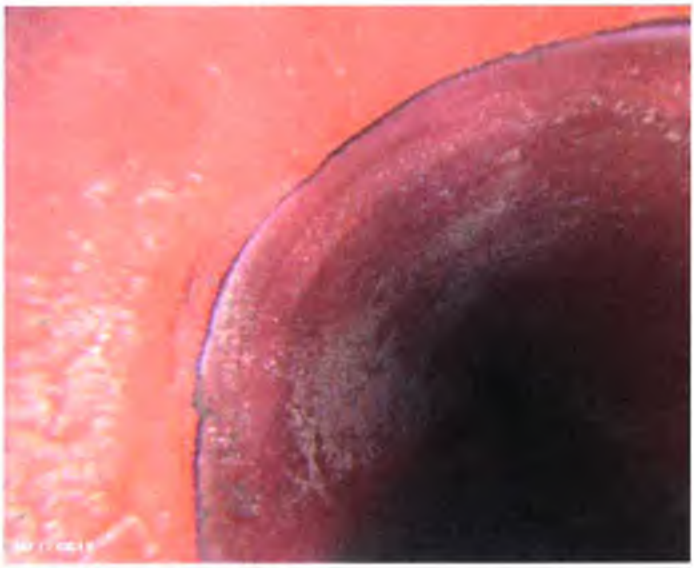
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**02be1f96-343c-47f8-8318-ae76fc4e6d64_250.1-MGP.jpg**		
Distance (ft):	**250.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**SSS**		
Description:	**Surface Spalling**		
Image Name:	**f536d6a8-8cb4-47a2-a98c-7a20288b892e_252.8-SSS.jpg**		
Distance (ft):	**252.8**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TFA		
Description:	**Tap Factory Active**		
Image Name:	**01a66844-2a88-4c0c-a056-ad93a0c2bcb5_253.4-TFA.jpg**		
Distance (ft):	**253.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

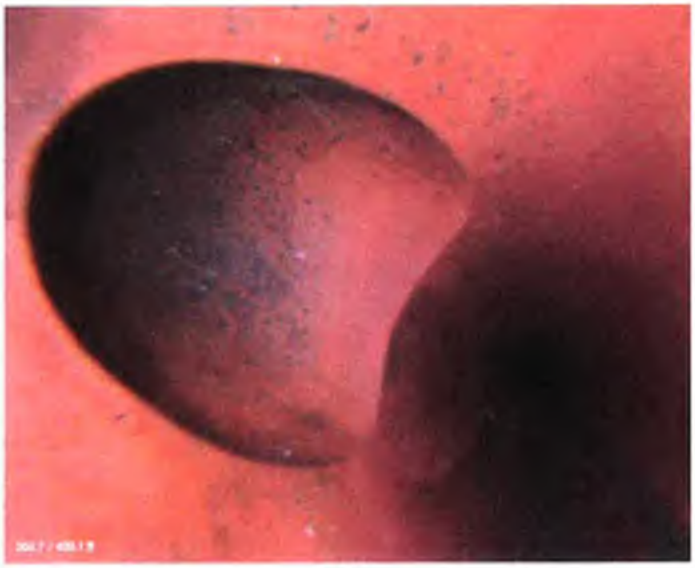
PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**15ae6ca8-dc0b-4e01-982c-c8022e79233c_262.3-TF.jpg**		
Distance (ft):	**262.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	SSS		
Description:	**Surface Spalling**		
Image Name:	**9ee548cb-66e2-42b2-99af-b7a552a1097b_267.1-SSS.jpg**		
Distance (ft):	**267.1**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**10**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

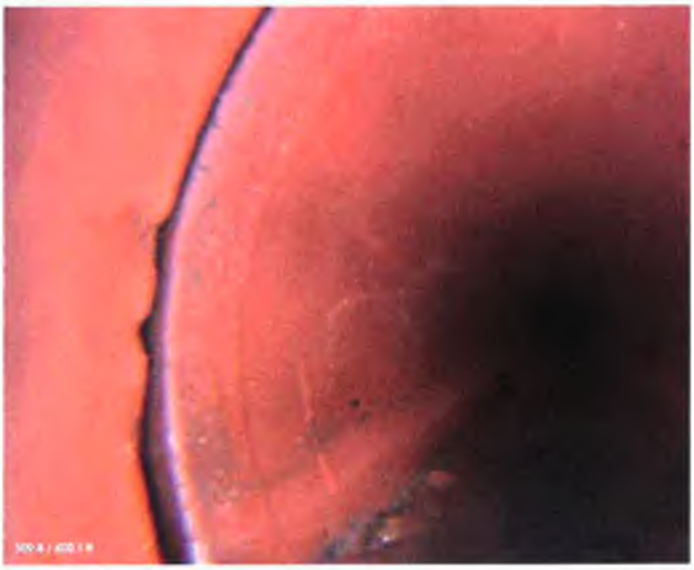
PACP Code:	MWL		
Description:	Water Level		
Image Name:	23b1b6e0-b636-4cb2-993e-53564a8cb913_274.3-MWL.jpg		
Distance (ft):	274.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	20		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	2f46a892-fb25-43fe-b55b-e736017a986c_300-MGP.jpg		
Distance (ft):	300		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	Tap Factory		
Image Name:	7849da67-a076-4c61-9ff8-8270ae96768e_304.7-TF.jpg		
Distance (ft):	304.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	a1dbff0f-afb5-462d-b404-8f6709dd5598_306-MWL.jpg		
Distance (ft):	306		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

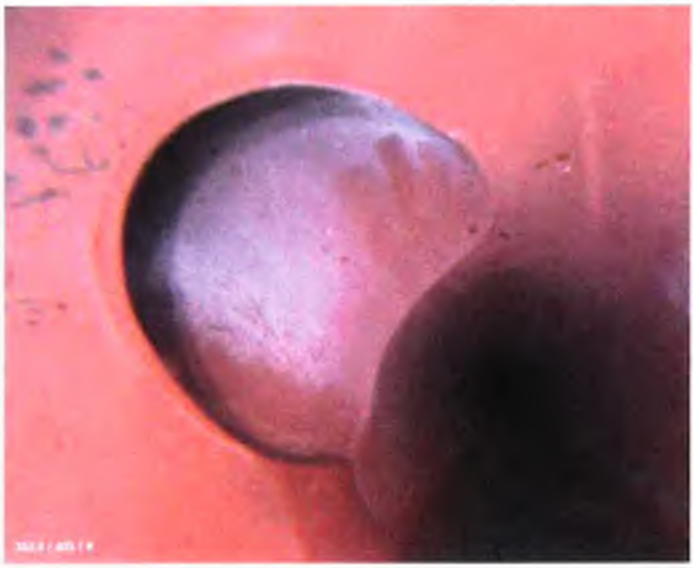


PACP Code:	SSS		
Description:	Surface Spalling		
Image Name:	7434ef89-3ea0-47da-9ff1-bc9fa2a0607e_309.8-SSS.jpg		
Distance (ft):	309.8		
Structural Grade:	2	Maintenance Grade	0
Percent Value:			
Clock At/From:	9	Clock To:	10
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

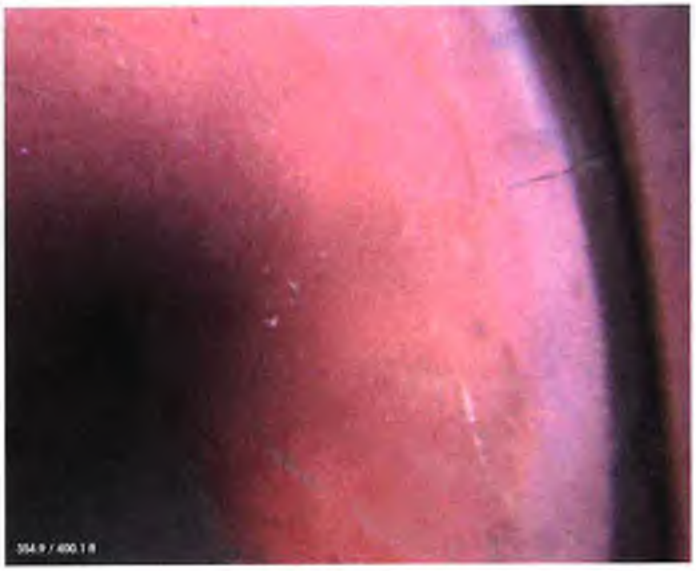
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	3b9e950a-7d65-4c8d-b28a-87f37d894be8_322.5-TF.jpg		
Distance (ft):	322.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	3	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	SSS		
Description:	**Surface Spalling**		
Image Name:	**7b2743b1-3019-4fe7-b239-2df9bec52625_337-SSS.jpg**		
Distance (ft):	**337**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

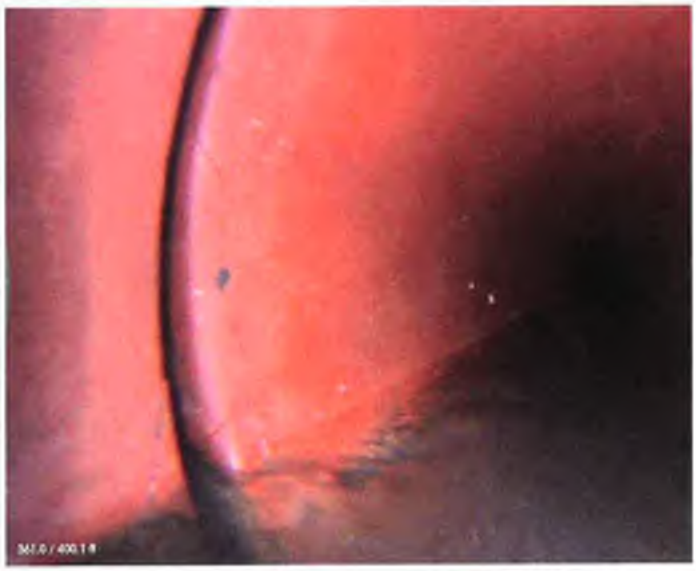
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**d71d753a-0079-4b82-9d0e-4f70c4e40563_350.5-MGP.jpg**		
Distance (ft):	**350.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



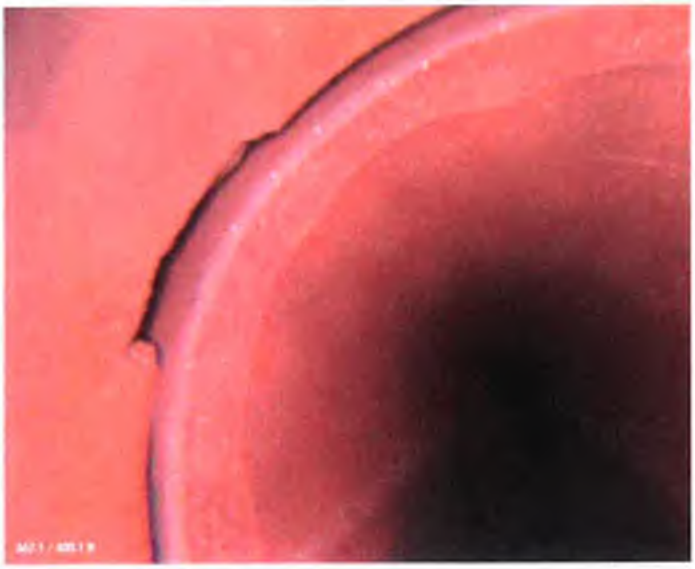
PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**bedd45ff-3c7d-4cfc-8e98-c69a290b7931_352.8-TF.jpg**		
Distance (ft):	**352.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**016c95d9-ea23-4039-95ab-b4dce0fbff91_354.9-FL.jpg**		
Distance (ft):	**354.9**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

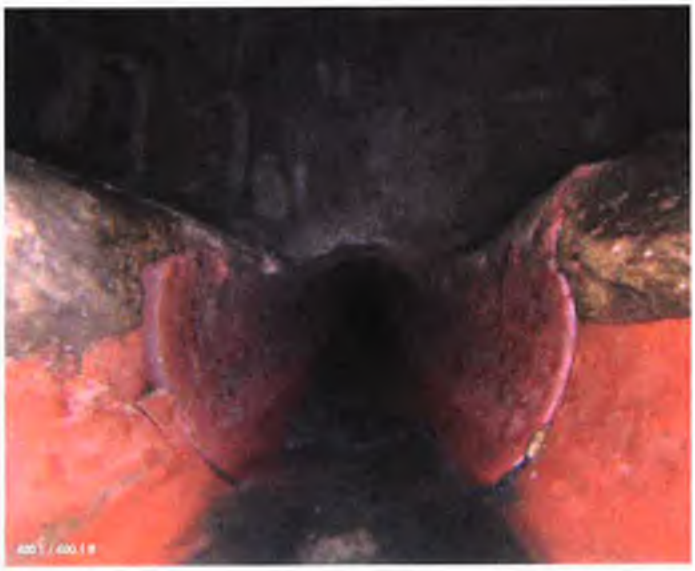


PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**c8184b59-da47-4371-adae-0cbc36216cd0_361-FM.jpg**		
Distance (ft):	**361**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**9**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**SSS**		
Description:	**Surface Spalling**		
Image Name:	**cdf15d6e-5003-4ba7-828e-04099c95fb37_367.1-SSS.jpg**		
Distance (ft):	**367.1**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**11**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**3fa55369-7bc1-42d6-81ad-89342ea0ea66_386-TF.jpg**		
Distance (ft):	**386**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**92b5336f-d97e-44c8-9ab6-928192d382ba_400.1-AMH.jpg**		
Distance (ft):	**400.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-1022 to 07-1021	07-1022	07-1021-a	Vitrified Clay Pipe	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		313	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/01/2010	12:19 PM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		313
Media Label	Reverse Setup	Work Order No	Additional Info	
NS6-1466	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
23	21	2
Overall Index	Structural Index	Maintenance Index
3.29	3.5	2
Overall Quick	Structural Quick	Maintenance Quick
4333	4333	2100

Recommendation

- CIPP Entire length of pipe (313)
- SPOT Repair → 63 ft (due to sag and bad fracture)

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 5% of cross sectional area
3	0.9	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint (US MH - 60) SR
-	4.3	[TF] Tap Factory at 3 o'clock
-	7	[TF] Tap Factory at 9 o'clock
-	15.7	[MWL] Water Level 40% of cross sectional area 40%
-	50.2	[MGP] General Photo
-	60.6	[MWL] Water Level 5% of cross sectional area
-	69.7	[TFA] Tap Factory Active at 3 o'clock
-	72.3	[TFA] Tap Factory Active at 10 o'clock
4	98.4	[FM] Fracture Multiple from 11 to 2 o'clock within 8" of joint (97 - 99)
-	100.1	[MGP] General Photo
4	131.4	[FM] Fracture Multiple from 9 to 3 o'clock within 8" of joint
-	131.8	[TBA] Tap Break-in Active at 1 o'clock J131 - 140
3	137.7	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	138.1	[TF] Tap Factory at 2 o'clock
2	140.1	[VR] Vermin Rat NOT within 8" of joint
-	140.7	[TFA] Tap Factory Active at 10 o'clock
-	150.3	[MGP] General Photo
-	180.2	[MWL] Water Level 15% of cross sectional area (15%)
-	200.1	[MGP] General Photo
-	208.9	[TFA] Tap Factory Active at 3 o'clock
-	210.6	[TF] Tap Factory at 10 o'clock
4	218.5	[FM] Fracture Multiple from 8 to 4 o'clock within 8" of joint SR (J219 - 222)
-	250.5	[MGP] General Photo
-	252.3	[TF] Tap Factory at 2 o'clock
3	290.5	[FL] Fracture Longitudinal at 10 o'clock within 8" of joint @ J191
-	300.1	[MGP] General Photo
-	313.4	[AMH] Manhole Remarks: End of survey

07-1022

Camera Direction

07-1021-a

Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	5% of cross sectional area				5	☐		
3	0.9	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
-	4.3	TF	Tap Factory	at 3 o'clock		4			☐	3	
-	7	TF	Tap Factory	at 9 o'clock		4			☐	9	
-	15.7	MWL	Water Level	40% of cross sectional area				40	☐		

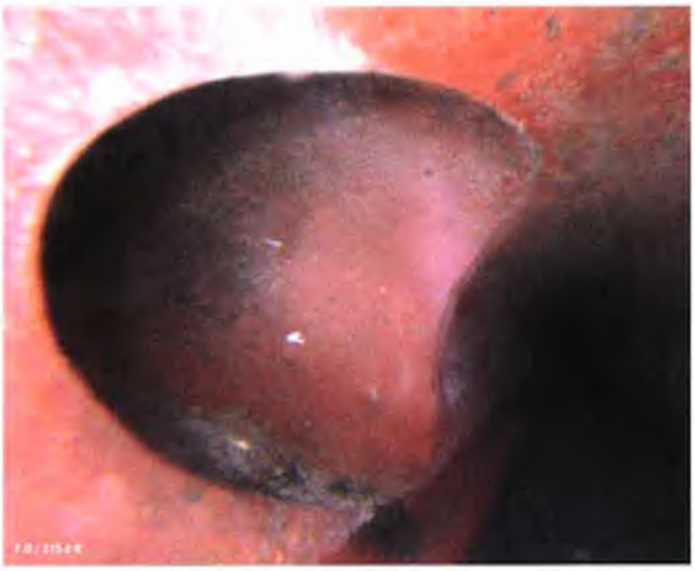
-	50.2	MGP	General Photo						☐		
-	60.6	MWL	Water Level	5% of cross sectional area				5	☐		
-	69.7	TFA	Tap Factory Active	at 3 o'clock		4			☐	3	
-	72.3	TFA	Tap Factory Active	at 10 o'clock		4			☐	10	
4	98.4	FM	Fracture Multiple	from 11 to 2 o'clock within 8" of joint					☑	11	2
-	100.1	MGP	General Photo						☐		
4	131.4	FM	Fracture Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3
-	131.8	TBA	Tap Break-in Active	at 1 o'clock		4			☐	1	
3	137.7	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	138.1	TF	Tap Factory	at 2 o'clock		4			☐	2	
2	140.1	VR	Vermin Rat	NOT within 8" of joint		1			☐		
-	140.7	TFA	Tap Factory Active	at 10 o'clock		4			☐	10	
-	150.3	MGP	General Photo						☐		
-	180.2	MWL	Water Level	15% of cross sectional area				15	☐		
-	200.1	MGP	General Photo						☐		
-	208.9	TFA	Tap Factory Active	at 3 o'clock		4			☐	3	
-	210.6	TF	Tap Factory	at 10 o'clock		4			☐	10	
4	218.5	FM	Fracture Multiple	from 8 to 4 o'clock within 8" of joint					☑	8	4
-	250.5	MGP	General Photo						☐		
-	252.3	TF	Tap Factory	at 2 o'clock		4			☐	2	
3	290.5	FL	Fracture Longitudinal	at 10 o'clock within 8" of joint					☑	10	
-	300.1	MGP	General Photo						☐		
-	313.4	AMH	Manhole	Remarks: End of survey					☐		

PACP Code:	AMH		
Description:	Manhole		
Image Name:	cd2e4d3b-bd7d-4c56-b29b-76114bbc6036_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**00c77d23-46a1-47b0-b30c-2b555b49b575_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**5**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**e105fe57-ae8e-47dd-a19b-af09cbe2734f_0.9-FL.jpg**		
Distance (ft):	**0.9**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**551a9abc-6998-4676-bdb8-6a8da226dc15_4.3-TF.jpg**		
Distance (ft):	**4.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

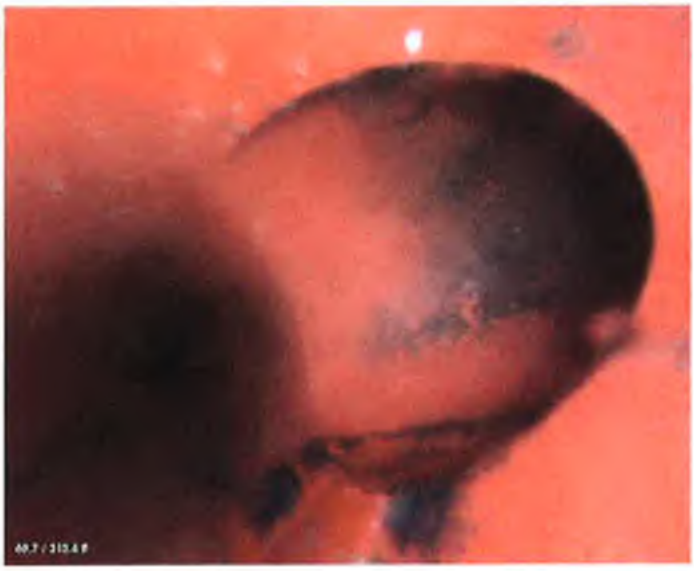


PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**349c4bcf-3533-4527-a3e2-dc6386b22fdd_7-TF.jpg**		
Distance (ft):	**7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	**Water Level**		
Image Name:	**627d9e50-cd69-4a92-acc5-866359fff5dc_15.7-MWL.jpg**		
Distance (ft):	**15.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**40**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**adfbd73b-00bf-4ea1-b11e-bad039d260ba_50.2-MGP.jpg**		
Distance (ft):	**50.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	**Water Level**		
Image Name:	**4825cc8a-8f42-40b4-a8f8-943140f4a112_60.6-MWL.jpg**		
Distance (ft):	**60.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**5**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

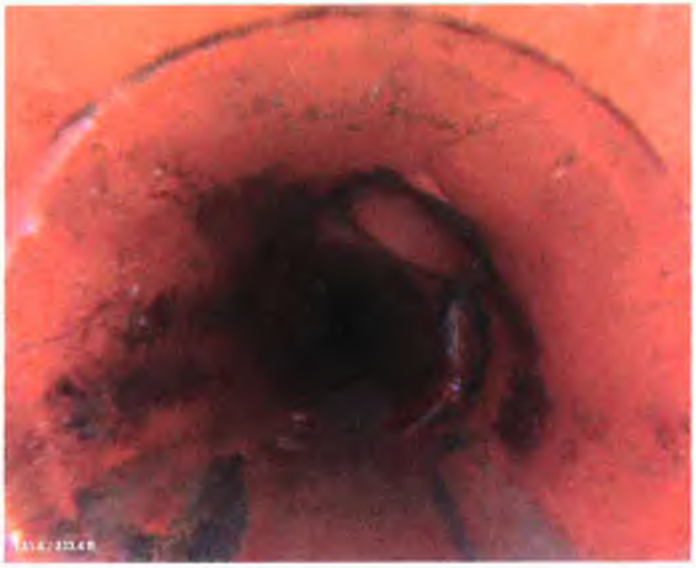


PACP Code:	TFA		
Description:	**Tap Factory Active**		
Image Name:	**121394a7-e951-4e18-88dc-d379845604dc_69.7-TFA.jpg**		
Distance (ft):	**69.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

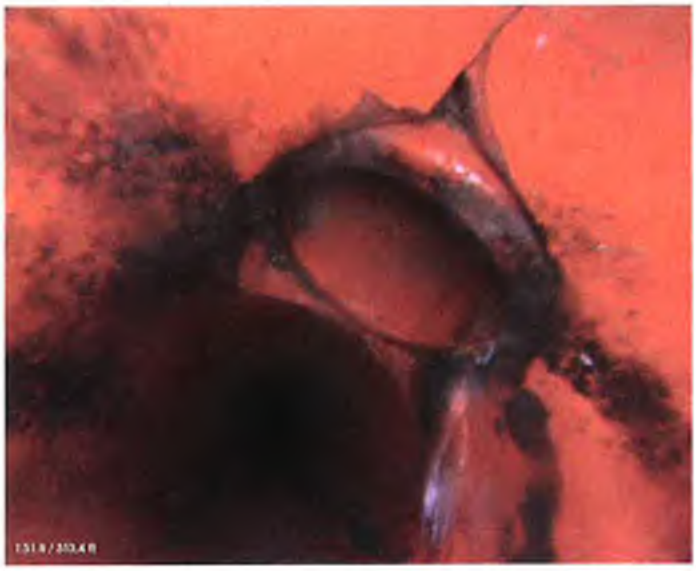
PACP Code:	TFA		
Description:	**Tap Factory Active**		
Image Name:	**7de2e93c-54d3-439a-b6fc-444f6abf87bf_72.3-TFA.jpg**		
Distance (ft):	**72.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**e2d24001-4dee-412c-9d6b-13e320302d66_98.4-FM.jpg**		
Distance (ft):	**98.4**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**fb961310-9500-4b4a-8bac-8a9bd457a48f_100.1-MGP.jpg**		
Distance (ft):	**100.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



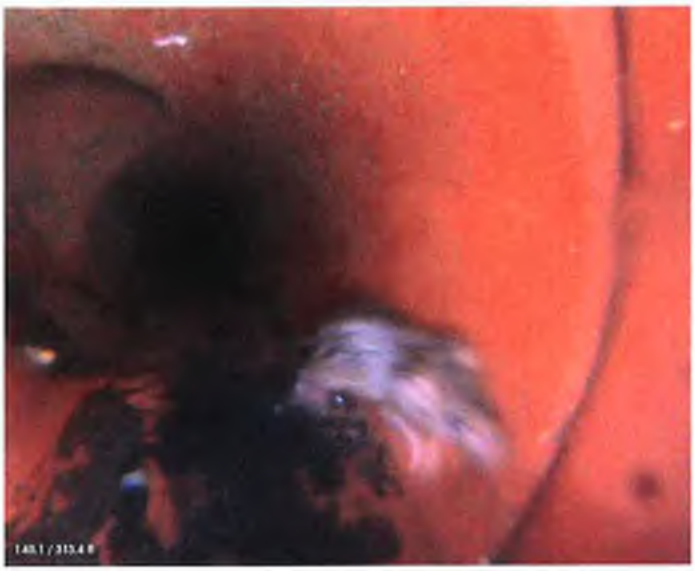
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**24f2dba9-5269-46f7-ab78-97019836e749_131.4-FM.jpg**		
Distance (ft):	**131.4**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



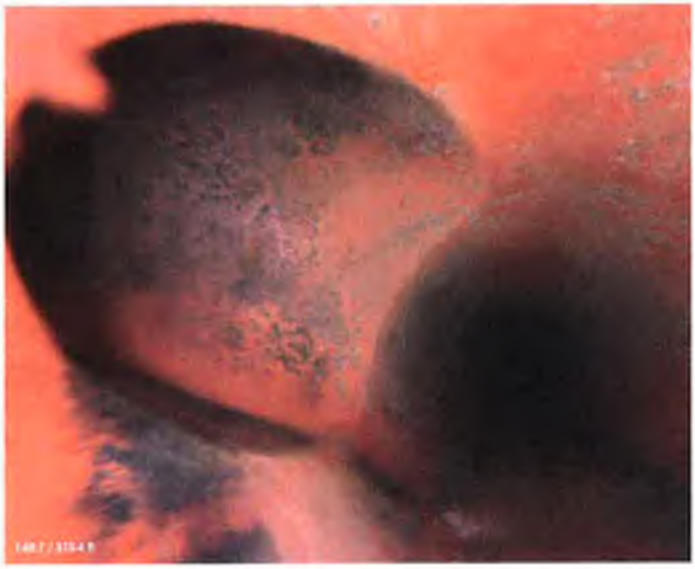
PACP Code:	**TBA**		
Description:	**Tap Break-in Active**		
Image Name:	**0bb9a592-7fbd-41f8-b65e-1a9f88f3c7d3_131.8-TBA.jpg**		
Distance (ft):	**131.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**4bc04cb5-e3aa-4727-9f07-df7f092f35a2_137.7-FL.jpg**		
Distance (ft):	**137.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**f82ed957-1510-4464-b627-03e56fee2b22_138.1-TF.jpg**		
Distance (ft):	**138.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	VR		
Description:	Vermin Rat		
Image Name:	cd398e0e-8012-4b23-8091-c9f3f8d757b2_140.1-VR.jpg		
Distance (ft):	140.1		
Structural Grade:	0	Maintenance Grade	2
Percent Value:			
Clock At/From:		Clock To:	
1st Value:	1	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

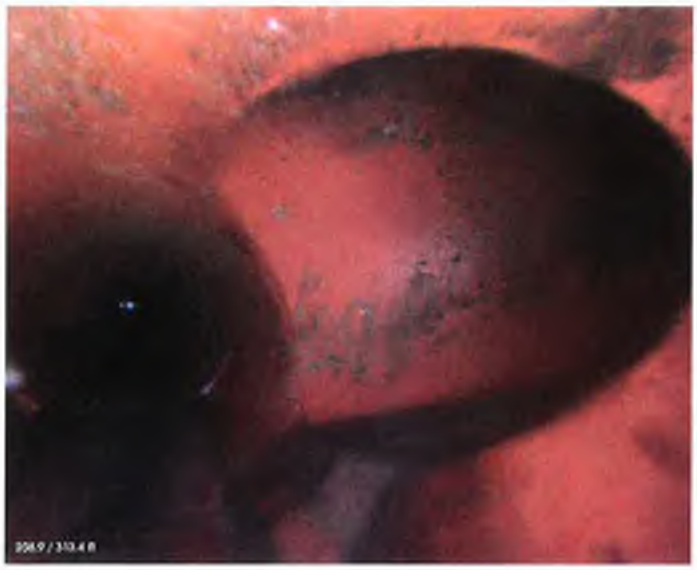


PACP Code:	TFA		
Description:	Tap Factory Active		
Image Name:	811c95f0-66cd-4795-a4ab-c10ea54f00d4_140.7-TFA.jpg		
Distance (ft):	140.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

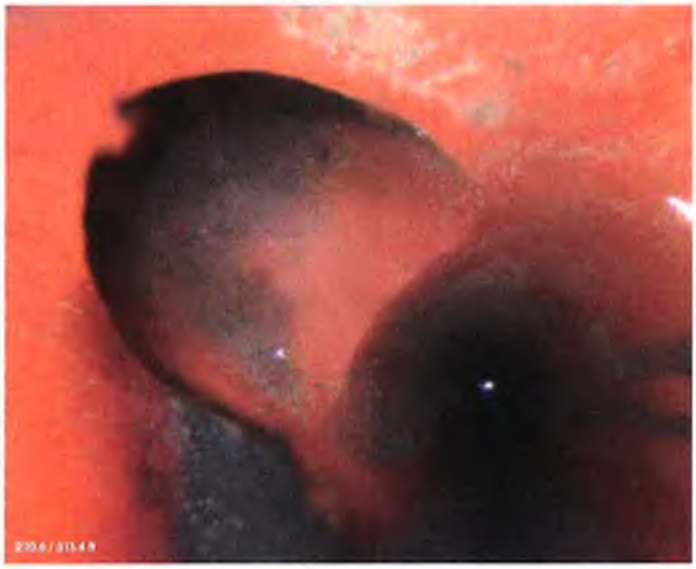
PACP Code:	MGP		
Description:	General Photo		
Image Name:	d7c79877-1830-442e-a4db-c5774a3e0baf_150.3-MGP.jpg		
Distance (ft):	150.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**aebc8a24-aa67-4862-9b88-3bbb7812b206_180.2-MWL.jpg**		
Distance (ft):	**180.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**15**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**ca0044d1-a72a-4d76-aab8-4d6683af2a84_200.1-MGP.jpg**		
Distance (ft):	**200.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



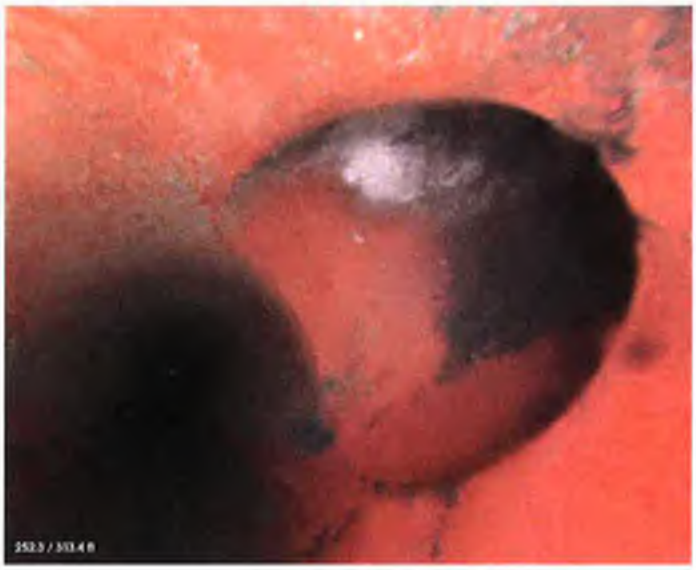
PACP Code:	**TFA**		
Description:	**Tap Factory Active**		
Image Name:	**fe7c97a4-8aef-44fa-b058-f02cb4b16055_208.9-TFA.jpg**		
Distance (ft):	**208.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



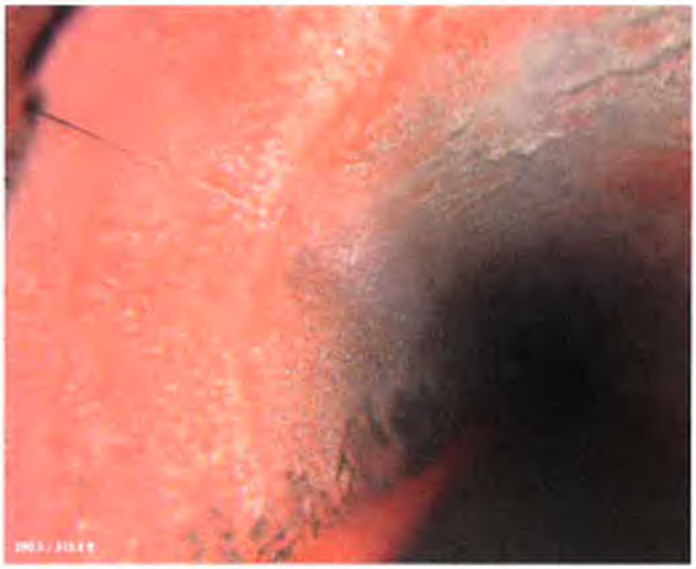
PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**7ec116a7-bf1e-46b5-a3ea-3e27e417ff51_210.6-TF.jpg**		
Distance (ft):	**210.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**aadadf6b-def3-4b2a-9731-531b91461e08_218.5-FM.jpg**		
Distance (ft):	**218.5**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**ce93536e-61bf-4fd9-ab14-21ab3774ead1_250.5-MGP.jpg**		
Distance (ft):	**250.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**7c2e7f21-ce07-41eb-958a-9c535f57993c_252.3-TF.jpg**		
Distance (ft):	**252.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**8feae83b-1d38-44d5-9e6e-853f74907d13_290.5-FL.jpg**		
Distance (ft):	**290.5**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**f826e019-d032-4179-9357-6f668937f5f0_300.1-MGP.jpg**		
Distance (ft):	**300.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**2b76f868-5ea6-465f-a6c1-b39ec7f66795_313.4-AMH.jpg**		
Distance (ft):	**313.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 1 / 26

MANHOLE NO.: 07 - 1017

Surveyed by: Danny and Johnny

Street: Varsity and North Hill

Cert. no.:

MH Location Details:
Between varsity and Orchard in dirt alley

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

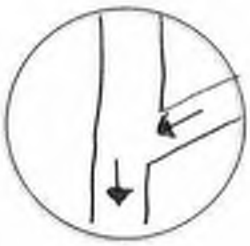
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Repair, brick Chimney

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 3 / 26

MANHOLE NO.: 07 – 1015

Surveyed by: Danny and Johnny

Street: Orchard Street

Cert. no.:

MH Location Details:

Along Orchard Street off of Campus Drive

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:

Assumes outgoing pipe @ 6:00

MH Condition Comments:

Frame is flaking and corroded

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 7 / 26

MANHOLE NO.: 07 - 1014 **Surveyed by:** Danny and Johnny

Street: Orchard and Campus Drive **Cert. no.:**

MH Location Details:
On Orchard Street and Intersection of Campus Drive

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:

Assumes outgoing pipe @ 6:00

MH Condition Comments:
Brick chimney

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 5 / 26

MANHOLE NO.: 07 - 1013

Surveyed by: Danny and Johnny

Street: Alleyway

Cert. no.:

MH Location Details:
Alleyway between Grapevine Drive and Orchard Street

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

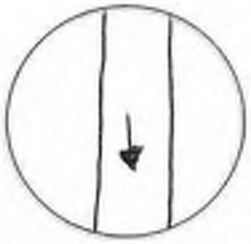
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 6 / 26

MANHOLE NO.: 07 _ 1011

Surveyed by: Danny and Johnny

Street: Alley way (South)

Cert. no.:

MH Location Details:
Alley way between Campus Drive and Plum Tree Drive

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

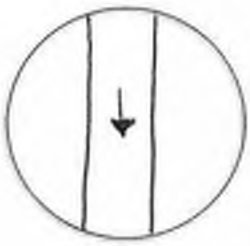
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Brick manhole

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 7 / 26

MANHOLE NO.: 07 _ 1010

Surveyed by: Danny and Johnny

Street: Alleyway (South side)

Cert. no.:

MH Location Details:

Alleyway between Campus Drive and Plum Tree Drive

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

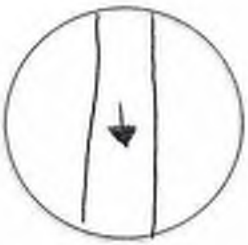
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: ~~Defective~~ / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

Brick Manhole

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7 / 24 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07-1018

Surveyed by: J-L

Street: 4th

Cert. no.:

MH Location Details:
Adj. to alley / car Lot

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Ins / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

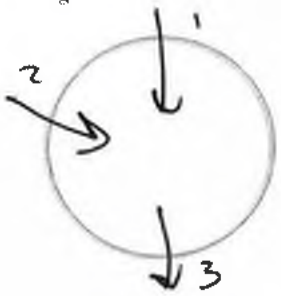
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
- Brick, Some Mortar Missing

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7 / 24 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07 - 1009

Surveyed by: J-L

Street: Campus Dr.

Cert. no.:

MH Location Details:

Adj to 301 Campus Dr.
Fire Dep

Access Type: Assumes Manhole: *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

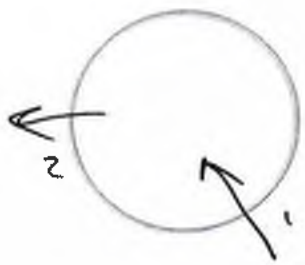
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

Bricks Breaking ~~chimney~~ cone
Frame Breaking

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	**Level 1**
Inspection Status:	**S.I.** (surface inspection)

Date: 8 / 7 / 2019

Sheet: 8 / 26

MANHOLE NO.: 07_ 1019

Surveyed by: Danny and Johnny

Street: Alleyway (South side)

Cert. no.:

MH Location Details:
Alleyway between Plum Tree Drive and North Hill Street

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

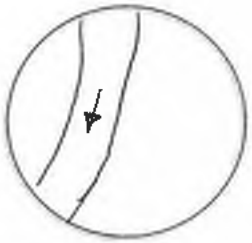
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Brick MH

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / [redacted] / 2019

Sheet: 9 / 26

MANHOLE NO.: 07 - 1020

Surveyed by: Danny and Johnny

Street: Alleyway (South)

Cert. no.:

MH Location Details:
Alleyway between Plum Tree Drive and North Hill Street

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / ~~None~~ / ~~Solid~~ **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound [redacted]

Chimney Condition: Defective / Sound / Unknown

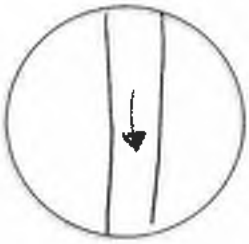
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Brick MH

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 10 / 26

MANHOLE NO.: 07 – 1021

Surveyed by: Danny and Johnny

Street: Grapevine Drive

Cert. no.:

MH Location Details:
Between Plum Street and North Hill Street

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound [redacted]

Chimney Condition: Defective / Sound / Unknown

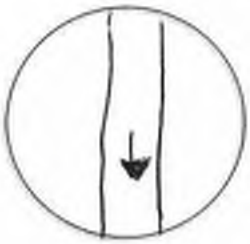
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Brick MH

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 4 / 26

MANHOLE NO.: 07 _ 1021 A **Surveyed by:** Danny and Johnny

Street: Between Plum Street and North Hill (Grapevine Drive) **Cert. no.:**

MH Location Details:
Between plum Street and North Hill

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

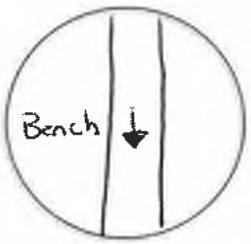
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Wall broken into channel. infiltration in walls

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Appendix F: Southwest Kovacevich Park Pipeline Project Reference Materials

Southwest Kovacevich Park Pipeline Project Cost Estimate

Reach No.	Item	Action	Cost
Number	Reach		
1	07-2008_07-2007_11/30/2010_U	Replacement	$ 80,000.00
2	07-2007_07-2005_11/30/2010_D	Replacement	$ 47,000.00
3	07_2006_07_2005_9/11/2015_16:27	Lining	$ 62,000.00
4	07-2005_07-2003_11/30/2010_D	Replacement	$ 79,000.00
5	07_2004_07_2003_9/11/2015_16:27	Spot Repair + Lining	$ 73,000.00
6	07-2003_07-2001_11/30/2010_D	Replacement	$ 80,000.00
7	07_2002_07_2001_9/11/2015_16:27	Replacement	$ 147,000.00
8	07-2001_07-0006_10/27/2009_U	Spot Repair + Lining	$ 48,000.00
9	07_4005_07_4004_9/11/2015_16:27	Replacement	$ 144,000.00
10	07_4004_07_4002_9/11/2015_16:27	Replacement	$ 107,000.00
11	07-4003_07-4002_10/27/2009_U	Lining	$ 16,000.00
12	07-4002_07-4001_10/27/2009_D	Replacement	$ 52,000.00
13	07-4001_07-0009_11/30/2010_U	Replacement	$ 13,000.00
14	07-0009_07-0008_11/30/2010_U	Replacement	$ 38,000.00
15	07_3002_07_0008_9/14/2015_11:26	Lining	$ 19,000.00
16	07-0008_07-0007_11/30/2010_U	Replacement	$ 82,000.00
17	07-3001_07-0007_11/30/2010_U	Replacement	$ 60,000.00
18	07-0007_07-0006_11/30/2010_D	Replacement	$ 38,000.00
19	07_0006_07_0005_9/14/2015_11:40	Replacement	$ 79,000.00
20	07-0005_07-0004_10/27/2009_D	Replacement	$ 85,000.00
21	07-0004_07-0003_10/27/2009_D	Lining	$ 26,000.00
22	03-9007_03-9006_11/11/2011_316.799988_	Replacement	$ 76,000.00
	Manholes		
	07_4005	Replace	$ 8,000.00
	07_4004	Replace	$ 8,000.00
	07_4002	Replace	$ 8,000.00
	07_4001	Replace	$ 8,000.00
	07_0009	Replace	$ 8,000.00
	07_0008	Replace	$ 8,000.00
	07_0007	Replace	$ 8,000.00
	07_0006	Replace	$ 8,000.00
	07_0005	Replace	$ 8,000.00
	07_2001	Replace	$ 8,000.00
	07_3001	Replace	$ 8,000.00
	07_2002	Replace	$ 8,000.00
	07_2004	Replace	$ 8,000.00
	07_2003	Replace	$ 8,000.00
	07_2005	Replace	$ 8,000.00

07_2006	Replace	$	8,000.00
07_2007	Replace	$	8,000.00
07_2008	Replace	$	8,000.00
07_0004	Replace	$	8,000.00
03_9006	Replace	$	8,000.00
03_9007	Replace	$	8,000.00

Total Construction Cost		$	1,619,000.00
Engineering & Construction Management	25%	$	405,000.00
Contingencies	20%	$	324,000.00
Administrative	5%	$	81,000.00
CIP Estimate		**$**	**2,429,000.00**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 9 / 24 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07-0004

Surveyed by: J-L

Street: Campus Dr.

Cert. no.:

MH Location Details:

Adj. to City Hall

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

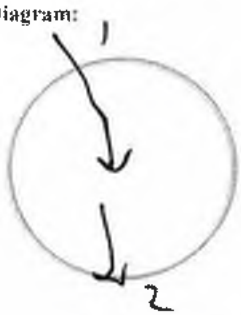
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

- Bricks Falling apart
- Channel Broken, but functions

Recommendation	Replace / Repair / Do-Nothing
Level 2 Inspection Recommended?	Yes / No

Harris & Associates

MANHOLE OBSERVATION FORM

Project:	Arvin Sewer Master Plan	Project No.:	1800032001
City:	Arvin, CA	Task Order No.:	3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 11 / 26

MANHOLE NO.: 07 _ ~~[illegible]~~ 0006

Surveyed by: Danny and Johnny

Street: [redacted] North Hill Street

Cert. no.:

MH Location Details:
Between Bear Mountain Boulevard and 4th Ave

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / (Corroded) / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / (None) / ~~Solid~~ **Condition:** Broken / ~~Corroded~~ / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / (Corroded) / Cracked / Missing / ~~Sound~~

Chimney Condition: (Defective) / Sound / Unknown

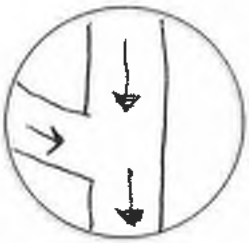
Cone Condition: (Defective) / Sound / Unknown

Wall Condition: (Defective) / Sound / Unknown

Bench Condition: Defective / (Sound) / Unknown

Channel Condition: Defective / (Sound) / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Aggregate showing @ walls and Chimney
Corrosion from gas fumes (H_2S)

Recommendation	**Replace / (Repair) / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

MANHOLE OBSERVATION FORM

Harris & Associates

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7 / 25 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07-0006

Surveyed by: J-L

Street: N. Hill

Cert. no.:

MH Location Details:

Next to Vallarta Market

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown corroded

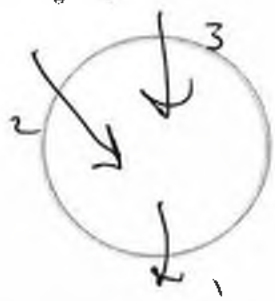
Cone Condition: Defective / Sound / Unknown H_2S

Wall Condition: Defective / Sound / Unknown Corroded

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

concrete corroded

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7 / 19 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07-0007

Surveyed by: J-L

Street: Alley N. Hill st.

Cert. no.:

MH Location Details:
- Alley behind ~~at~~ Cricket Wireless

Access Type: Assumes Manhole: *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

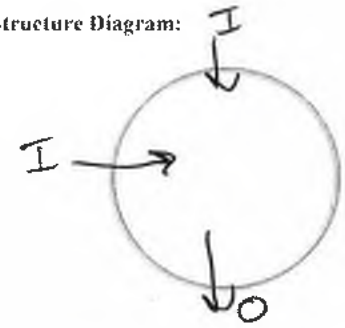
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



*Assumes outgoing pipe @ 6:00?

MH Condition Comments:
- cover Cracked
- SAP wall
- cracked ~~chimney~~ cone

Recommendation Replace / Repair / Do-Nothing

Level 2 Inspection Recommended? Yes / No

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 12 / 26

MANHOLE NO.: 07 – 0008

Surveyed by: Danny and Johnny

Street: Alley way

Cert. no.:

MH Location Details:
Alley way between A [redacted] Street and Acaia Street running east / west

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

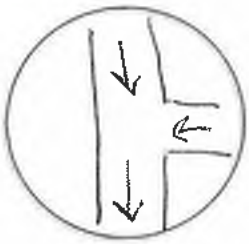
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Aggregate showing on Cone, Chimney, and walls
One of steps broken, gas fumes caused corrosion (H_2S)

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 14 / 26

MANHOLE NO.: 07-0009

Surveyed by: Danny and Johnny

Street: A Street

Cert. no.:

MH Location Details:
On A Street just north of Bear Mountain Boulevard

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

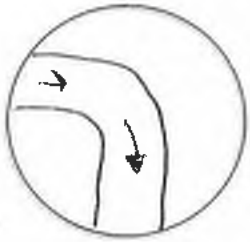
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Corrosion from fumes, aggregate showing H_2S

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019

Sheet: 13 / 26

MANHOLE NO.: 07 - 4001

Surveyed by: Danny and Johnny

Street: A Street

Cert. no.:

MH Location Details:
On A Street just north of Bear Mountain Boulevard

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:

Assumes outgoing pipe @ 6:00

MH Condition Comments:
Gas fume corrosion, aggregate wall
Hydrogen sulfide (frame)
H_2S

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 8 / 7 / 2019
Sheet: 15 / 26

MANHOLE NO.: 07 - 4002
Surveyed by: Danny and Johny
Street: Alley Way (East/west)
Cert. no.:

MH Location Details:
Between A Street and B street

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound [redacted]

Chimney Condition: Defective / Sound / Unknown

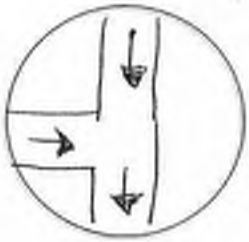
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:
Corrosion and aggregate showing (H_2S)

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level I
Inspection Status:	S.I. (surface inspection)

Date: 7 / 25 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07-4004

Surveyed by: J - L

Street: 4th ave

Cert. no.:

MH Location Details:

317 4th ave

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Insc / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown Breaking

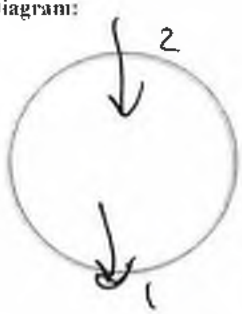
Cone Condition: Defective / Sound / Unknown I/I chimney/wall

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

Needs work Frame down → Replace

Recommendation	Replace / ~~Repair~~ / Do-Nothing
Level 2 Inspection Recommended?	Yes / No

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: / / 2019

Sheet: /

MANHOLE NO.: 07 - 4005

Surveyed by: J-L

Street: Alley off 5th

Cert. no.:

MH Location Details:

Alley Between Blue houses

Access Type: Assumes Manhole: *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

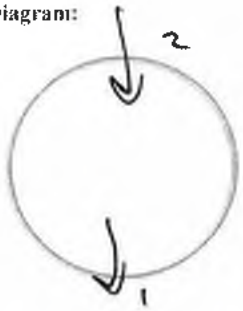
Cone Condition: Defective / Sound / Unknown I/I, SAP

Wall Condition: Defective / Sound / Unknown Some I/I

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

Repair corroded Frame and I/I wall

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project:	Arvin Sewer Master Plan	Project No.:	1800032001
City:	Arvin, CA	Task Order No.:	3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level I
Inspection Status:	S.I. (surface inspection)

Date: 7 / 25 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07-2001

Surveyed by: J-L

Street: 4th / N. Hill

Cert. no.:

MH Location Details:

Int. 4th / N. Hill

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown SAP

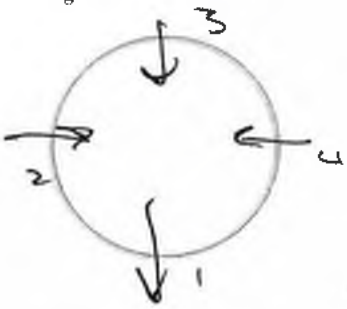
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown SAP

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

Concrete deteriorated a lot

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

MANHOLE OBSERVATION FORM

Harris & Associates

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7/25/2019

Sheet: 1 / 1

MANHOLE NO.: 07-2002

Surveyed by: J-L

Street: 4th Ave.

Cert. no.:

MH Location Details:

Parking Lot; 4th / N. A

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown ~~Sound~~ Corroded

Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:

Assumes outgoing pipe @ 6:00

MH Condition Comments:

Badly Corroded throughout

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project:	Arvin Sewer Master Plan	Project No.:	1800032001
City:	Arvin, CA	Task Order No.:	3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7 / 19 / 2019

Sheet: 1 / 1

MANHOLE NO.: D7 - 2003

Surveyed by: JDA

Street: North Hill

Cert. no.:

MH Location Details:

North Hill and Stuart

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown

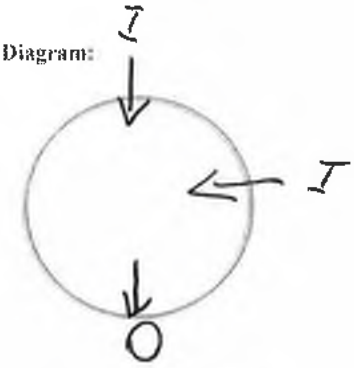
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

Infiltration

Recommendation Replace / Repair / Do-Nothing

Level 2 Inspection Recommended? Yes / No

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 180003001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7 / 25 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07 - 20041

Surveyed by: J-L

Street: Stuart St.

Cert. no.:

MH Location Details:

4101 Stuart St.

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown Breaking

Cone Condition: Defective / Sound / Unknown Breaking

Wall Condition: Defective / Sound / Unknown " "

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:

Assumes outgoing pipe @ 6:00

MH Condition Comments:

- Breaking, Maybe piece fell to bottom
- Should be replaced

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level I
Inspection Status:	S.I. (surface inspection)

Date: 7 / 25 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07-2005

Surveyed by: J-L

Street: Wilson / N. Hill

Cert. no.:

MH Location Details:

Int. Wilson / Hill

Access Type: Assumes Manhole; *Specify if other:* M H

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Insp / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown cracked

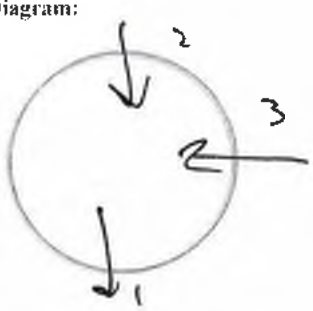
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown H_2S

Bench Condition: Defective / Sound / Unknown Broken

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

Repair Chimney & Bench

Recommendation **Replace / Repair / Do-Nothing**

Level 2 Inspection Recommended? **Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7 / 25 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07 - 2006

Surveyed by: J - L

Street: Wilson St.

Cert. no.:

MH Location Details:

4100 Wilson St.

Access Type: Assumes Manhole; *Specify if other:* Mt

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown Cracks / Break

Cone Condition: Defective / Sound / Unknown Breaking

Wall Condition: Defective / Sound / Unknown Cracks

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:

Assumes outgoing pipe @ 6:00

MH Condition Comments:

Breaking - Replace

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: 7 / 24 / 2019

Sheet: 1 / 1

MANHOLE NO.: 07 - 2007

Surveyed by: J-C

Street: 5th Ave

Cert. no.:

MH Location Details:

Int. 5th ave / N. Hill

Access Type: Assumes Manhole; *Specify if other:* MH

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Inst. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown H_2S, Crack

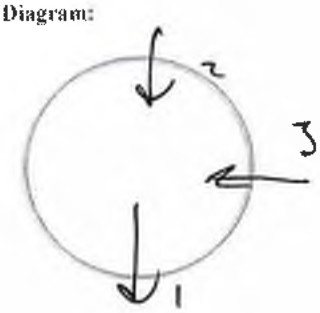
Cone Condition: Defective / Sound / Unknown

Wall Condition: Defective / Sound / Unknown SAP

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

1) Repair Chimney
2) SAP Lower wall

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

Harris & Associates

MANHOLE OBSERVATION FORM

Project: Arvin Sewer Master Plan
City: Arvin, CA

Project No.: 1800032001
Task Order No.: 3.11 (Manhole Inspection)

Purpose:	G (CIP Assessment)
Inspection level:	Level 1
Inspection Status:	S.I. (surface inspection)

Date: / / 2019

Sheet: /

MANHOLE NO.: 07-2008

Surveyed by: J-L

Street: 5th ave

Cert. no.:

MH Location Details:

450 5th ave

Access Type: Assumes Manhole; *Specify if other:*

Component Conditions (Circle one):

Cover Condition: Bolts Missing / Broken / Corroded / Cracked / Missing / Restraint Missing / Restraint Defective / Sound

Cover Adjustment Ring: **Type:** Adjustable / None / Solid **Condition:** Broken / Corroded / Cracked / Poor Insp. / Sound

Frame Condition: Broken / Coated / Corroded / Cracked / Missing / Sound

Chimney Condition: Defective / Sound / Unknown H_2S

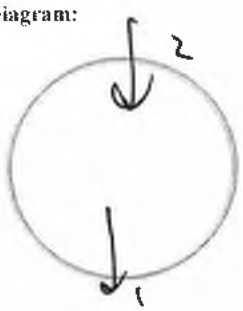
Cone Condition: Defective / Sound / Unknown H_2S

Wall Condition: Defective / Sound / Unknown Cracked

Bench Condition: Defective / Sound / Unknown

Channel Condition: Defective / Sound / Unknown

Structure Diagram:



Assumes outgoing pipe @ 6:00

MH Condition Comments:

- H_2S damage throughout

Recommendation	**Replace / Repair / Do-Nothing**
Level 2 Inspection Recommended?	**Yes / No**

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-2008 to 07-2007	07-2008	07-2007	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		339	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
5th Ave	City of Arvin	Light Highway	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	12:49 PM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		339
Media Label	Reverse Setup	Work Order No	Additional Info	
NS23-1460	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
0	0	0
Overall Index	Structural Index	Maintenance Index
0	0	0
Overall Quick	Structural Quick	Maintenance Quick
0000	0000	0000

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 40% of cross sectional area
-	50	[MGP] General Photo
-	90	[TF] Tap Factory at 10 o'clock
-	100.5	[MGP] General Photo
-	147.4	[TF] Tap Factory at 10 o'clock
-	150.4	[MGP] General Photo
-	192.5	[TF] Tap Factory at 10 o'clock
-	200.6	[MGP] General Photo
-	250.2	[MGP] General Photo
-	262.2	[TFA] Tap Factory Active at 10 o'clock
-	300.2	[MGP] General Photo
-	301.3	[TF] Tap Factory at 9 o'clock
-	339.2	[AMH] Manhole Remarks: End of survey

* due to no video, open trench pipe replacement

Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	40% of cross sectional area				40	☐		
-	50	MGP	General Photo						☐		
-	90	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	100.5	MGP	General Photo						☐		
-	147.4	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	150.4	MGP	General Photo						☐		
-	192.5	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	200.6	MGP	General Photo						☐		
-	250.2	MGP	General Photo						☐		
-	262.2	TFA	Tap Factory Active	at 10 o'clock		4			☐	10	
-	300.2	MGP	General Photo						☐		
-	301.3	TF	Tap Factory	at 9 o'clock		4			☐	9	
-	339.2	AMH	Manhole	Remarks: End of survey					☐		

PACP Code:	AMH		
Description:	Manhole		
Image Name:	af30c1da-b894-4387-be8f-bfefa9965364_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

PACP Code:	MWL		
Description:	Water Level		
Image Name:	63dd5726-cd82-412a-9be3-86e51d6d0d16_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	40		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

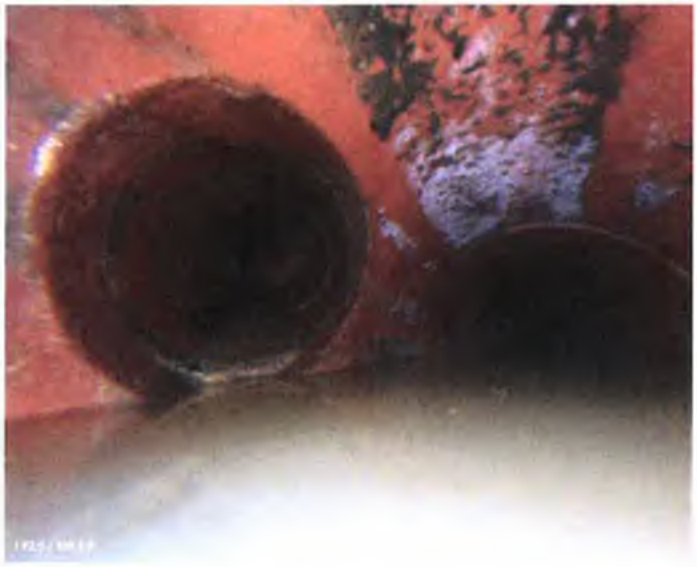
PACP Code:	MGP		
Description:	General Photo		
Image Name:	9ed10c86-1400-4b8e-bb68-8e6fca8eb51f_50-MGP.jpg		
Distance (ft):	50		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	83a8b6f4-aa4a-462a-b272-6db56f0a8d04_90-TF.jpg		
Distance (ft):	90		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	c33ed953-1799-48d8-ad31-433de27bce94_100.5-MGP.jpg		
Distance (ft):	100.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**f716c68d-360e-4d8d-bc32-f5c342ccd1e3_147.4-TF.jpg**		
Distance (ft):	**147.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

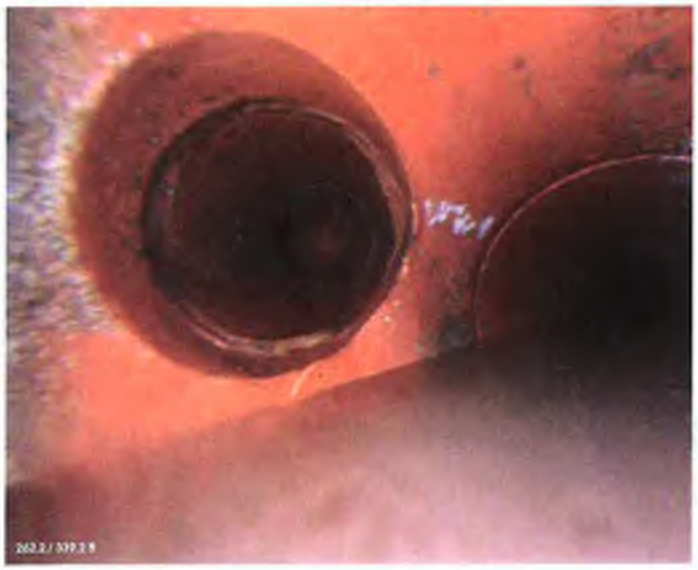
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**cc0bf8eb-db09-450e-bc40-91e8d4104aa9_150.4-MGP.jpg**		
Distance (ft):	**150.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**1070d0bd-9640-43dd-ae75-89ce1673f841_192.5-TF.jpg**		
Distance (ft):	**192.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	3b7ba896-cad5-4c9b-98a3-fc7c6fa43208_200.6-MGP.jpg		
Distance (ft):	200.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	41fd1d74-0100-4071-a5f9-1fc8842c933d_250.2-MGP.jpg		
Distance (ft):	250.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TFA		
Description:	Tap Factory Active		
Image Name:	3dbed8b8-8de9-4a9e-bce2-f2ae6a53b420_262.2-TFA.jpg		
Distance (ft):	262.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**248ef6b3-3f12-42a8-9ae1-f1365c84c8d4_300.2-MGP.jpg**		
Distance (ft):	**300.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**b12b63ab-b98a-4cce-aa7e-3d0373c338d9_301.3-TF.jpg**		
Distance (ft):	**301.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**b755427b-ea67-462b-8724-f20b8b917910_339.2-AMH.jpg**		
Distance (ft):	**339.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-2007 to 07-2005	07-2007	07-2005	Vitrified Clay Pipe	8	8
Shape	**Sewer Use**	**Drainage Area**	**Lining Method**	**Total Length**	**Joint Length**
Circular	Sanitary	NA		193	0
Pre-Cleaning	**Clean Date**	**Flow Control**	**Purpose**	**Year Laid**	**Year Renewed**
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
5th Ave	City of Arvin	Light Highway	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	12:54 PM	Downstream
Owner	**Customer**	**Weather**	**PO Number**	**Length Surveyed**
City of Arvin	Veolia	Dry		193
Media Label	**Reverse Setup**	**Work Order No**	**Additional Info**	
NS6-1460	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
4	0	4
Overall Index	**Structural Index**	**Maintenance Index**
4	0	4
Overall Quick	**Structural Quick**	**Maintenance Quick**
4100	0000	4100

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 10% of cross sectional area
-	50.8	[MGP] General Photo
-	75.2	[MWL] Water Level 30% of cross sectional area
-	100.8	[MGP] General Photo
-	125.2	[MWL] Water Level 50% of cross sectional area
-	143.5	[MWL] Water Level 40% of cross sectional area
-	150.1	[MGP] General Photo
-	153.9	[MWL] Water Level 50% of cross sectional area
4	160.1	[MCU] Camera Underwater NOT within 8" of joint
-	192.7	[AMH] Manhole Remarks: End of survey

Recommendation

- Open Trench Pipe Replacement (due to no video on file)

Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	10% of cross sectional area				10	☐		
-	50.8	MGP	General Photo						☐		
-	75.2	MWL	Water Level	30% of cross sectional area				30	☐		
-	100.8	MGP	General Photo						☐		
-	125.2	MWL	Water Level	50% of cross sectional area				50	☐		
-	143.5	MWL	Water Level	40% of cross sectional area				40	☐		
-	150.1	MGP	General Photo						☐		
-	153.9	MWL	Water Level	50% of cross sectional area				50	☐		
4	160.1	MCU	Camera Underwater	NOT within 8" of joint					☐		
-	192.7	AMH	Manhole	Remarks: End of survey					☐		

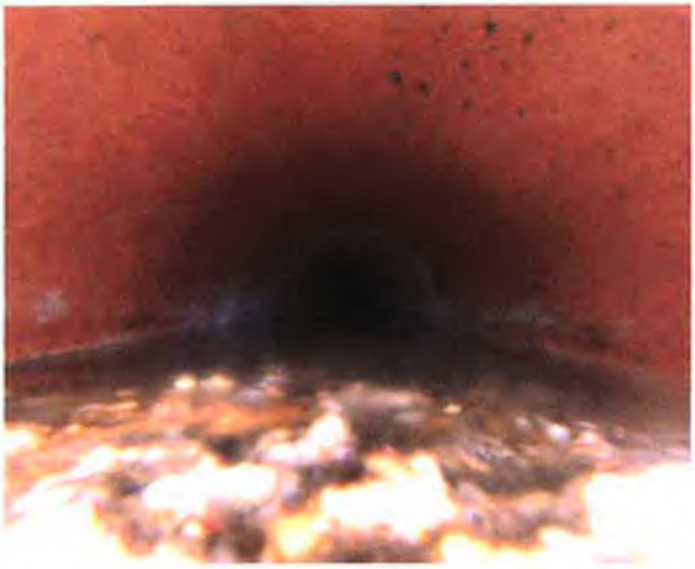
PACP Code:	AMH		
Description:	Manhole		
Image Name:	2ab514ec-b793-4e74-a069-61c6858534fd_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

PACP Code:	MWL		
Description:	Water Level		
Image Name:	6e1db2b5-dee5-4598-b541-1bb54e40a7cc_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**3cf3588a-c679-48da-8561-f503213d768a_50.8-MGP.jpg**		
Distance (ft):	**50.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

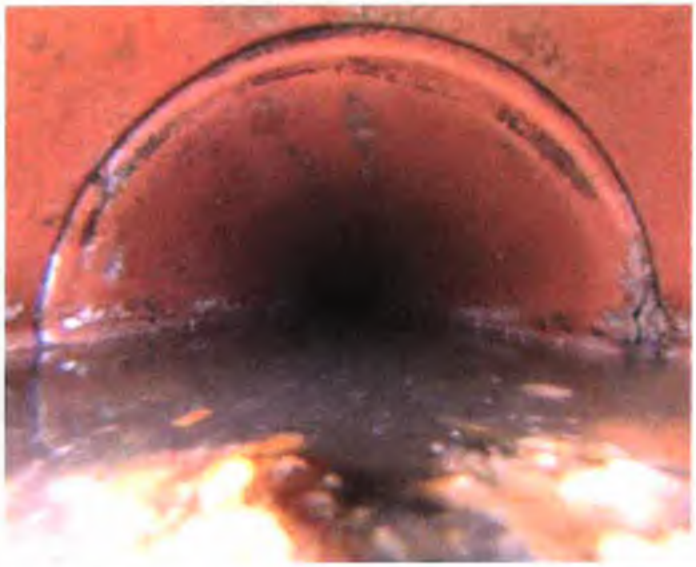
PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**c27b4859-87f9-4220-97e3-87be5e3a0aae_75.2-MWL.jpg**		
Distance (ft):	**75.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**30**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**8992624a-8540-4b78-8cbe-bcea66de93de_100.8-MGP.jpg**		
Distance (ft):	**100.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

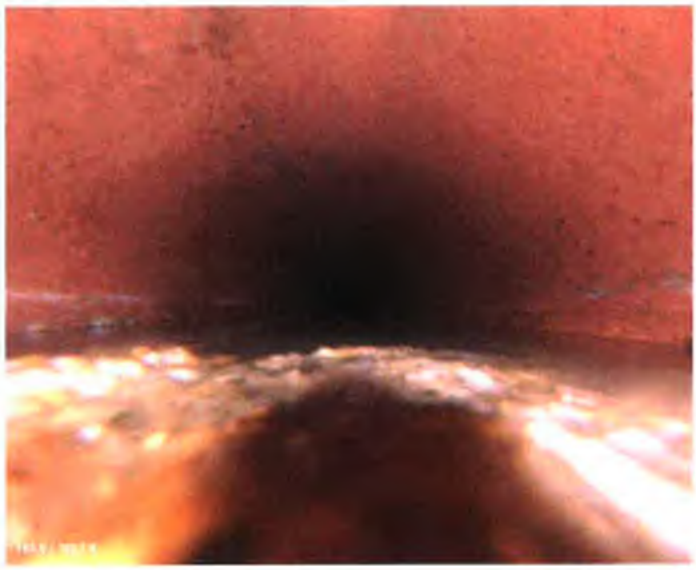


PACP Code:	MWL		
Description:	Water Level		
Image Name:	6bc1e7f9-97a6-41b3-964f-ef507e4a6643_125.2-MWL.jpg		
Distance (ft):	125.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	50		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	96423c9f-b3d4-4168-85be-26d98de8a5eb_143.5-MWL.jpg		
Distance (ft):	143.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	40		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	MGP		
Description:	General Photo		
Image Name:	e04c84e3-a5ca-4ff4-99e3-051af9f99c55_150.1-MGP.jpg		
Distance (ft):	150.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**a66dd345-7def-48c0-97a1-128a2d55770d_153.9-MWL.jpg**		
Distance (ft):	**153.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**50**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MCU**		
Description:	**Camera Underwater**		
Image Name:	**1fc0a0d4-a63f-4efb-9e8a-262c9aefaaab_160.1-MCU.jpg**		
Distance (ft):	**160.1**		
Structural Grade:	**0**	Maintenance Grade	**4**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**34862aaa-5340-4924-bdb3-ebd44087b3d9_192.7-AMH.jpg**		
Distance (ft):	**192.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

07-2006 to 07-2005

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

rd Street
Pittsburgh PA

Asset

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
to	07-2006	07-2005	Concrete Pipe non reinforced	8"	
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA			
Pre Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location

Street	City	Location	Details
Wilson St	City of Arvin	Light Highway	

Inspection

Surveyed By	Certificate No	Date	Time	Direction
JJC	U		PM	Downstream
Owner	**Customer**	**Weather**	**PO Number**	**Length Surveyed**
City of Arvin	Veolia	Dry		
Media Label	**Reverse Setup**	**Work Order No**	**Additional Info**	
NS	NO			

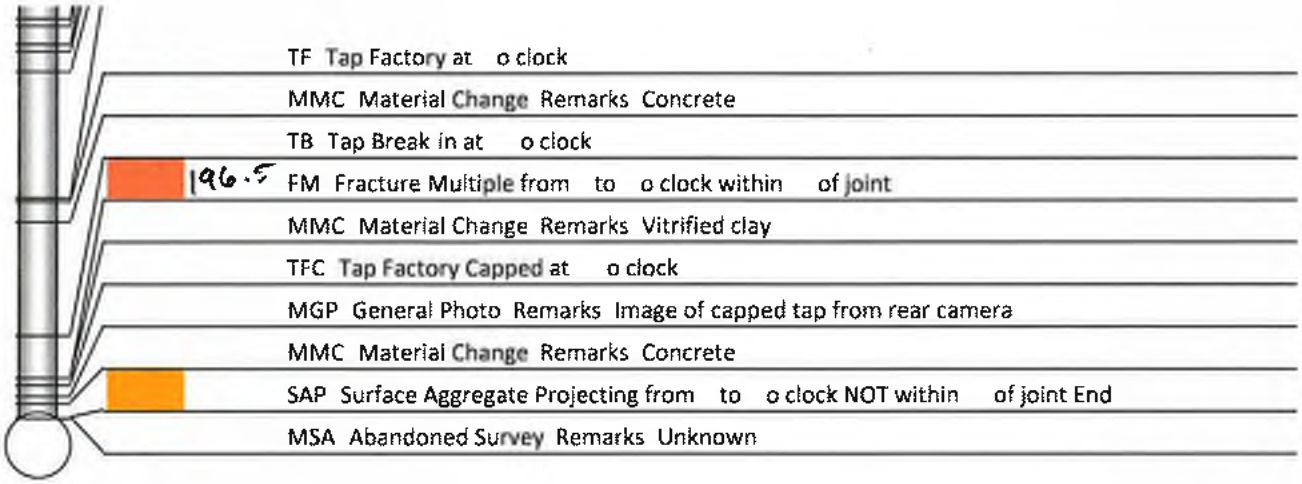
Results

Overall Rating	Structural Rating	Maintenance Rating
Overall Index	**Structural Index**	**Maintenance Index**
Overall Quick	**Structural Quick**	**Maintenance Quick**
G	G	

- 2 videos (2010, 2015), report is from 2010
- Rec: CIPP Lining full (620' estimated)

Grade	Dist ft	Observation
	0	AMH Manhole Remarks Begin survey
	0	SAP Surface Aggregate Projecting from to o clock NOT within of joint Start S3
	0	MWL Water Level of cross sectional area 10%
		MMC Material Change Remarks Vitrified clay
	3.1	TF Tap Factory at o clock
	5	MMC Material Change Remarks Concrete
	16.5	MMC Material Change Remarks Vitrified clay
	16.5	FM Fracture Multiple from to o clock within of joint J16.5 - J19.5 (3') S4
	17.3	TFA Tap Factory Active at o clock
	19.5	MMC Material Change Remarks Concrete
	24.5	TBI Tap Break in Intruding at o clock NOT within of joint Remarks Tap is active
	32	MWL Water Level of cross sectional area <5%
	39.9	FC Fracture Circumferential from to o clock NOT within of joint S2
	50.9	MGP General Photo
	66.7	MMC Material Change Remarks Vitrified clay
	67.2	TF Tap Factory at o clock
	69.2	MMC Material Change Remarks Concrete
	74.9	MMC Material Change Remarks Vitrified clay
	74.9	CM Crack Multiple from to o clock within of joint J75-J78 S3 (3')
		TFA Tap Factory Active at o clock
		MMC Material Change Remarks Concrete
	100.8	MGP General Photo
		VC Vermin Cockroach NOT within of joint
		MMC Material Change Remarks Vitrified clay
		TFC Tap Factory Capped at o clock
	118.4	FM Fracture Multiple from to o clock within of joint J119_ J122 (3') S4
		MMC Material Change Remarks Concrete
		TBI Tap Break in Intruding at o clock NOT within of joint
		MMC Material Change Remarks Vitrified clay
		TFC Tap Factory Capped at o clock
		MGP General Photo Remarks Image of capped tap from rear camera
		MMC Material Change Remarks Concrete
		MGP General Photo
		MMC Material Change Remarks Vitrified clay
	162.4	FM Fracture Multiple from to o clock within of joint
		TF Tap Factory at o clock
	164.9	CM Crack Multiple from to o clock within of joint
		TF Tap Factory at o clock
		MMC Material Change Remarks Concrete
		MMC Material Change Remarks Vitrified clay

Camera Direction



Condition Observations

Grade	Dist ft	Observation		Description	Cont	Values st	Values nd	Values	of Joint	Clock From	Clock To
		AMH	Manhole	Remarks Begin survey					☐		
		SAP	Surface Aggregate Projecting	from to o clock NOT within of joint Start	S				☐		
		MWL	Water Level	of cross sectional area					☐		
		MMC	Material Change	Remarks Vitrified clay					☐		
		TF	Tap Factory	at o clock					☐		
		MMC	Material Change	Remarks Concrete					☐		
		MMC	Material Change	Remarks Vitrified clay					☐		
		FM	Fracture Multiple	from to o clock within of joint					☑		
		TFA	Tap Factory Active	at o clock					☐		
		MMC	Material Change	Remarks Concrete					☐		
		TBI	Tap Break in Intruding	at o clock NOT within of joint Remarks Tap is active					☐		
		MWL	Water Level	of cross sectional area					☐		
		FC	Fracture Circumferential	from to o clock NOT within of joint					☐		
		MGP	General Photo						☐		
		MMC	Material Change	Remarks Vitrified clay					☐		
		TF	Tap Factory	at o clock					☐		
		MMC	Material Change	Remarks Concrete					☐		
		MMC	Material Change	Remarks Vitrified clay					☐		
		CM	Crack Multiple	from to o clock within of joint					☑		
		TFA	Tap Factory Active	at o clock					☐		
		MMC	Material Change	Remarks Concrete					☐		
		MGP	General Photo						☐		
		VC	Vermin Cockroach	NOT within of joint					☐		
		MMC	Material Change	Remarks Vitrified clay					☐		
		TFC	Tap Factory Capped	at o clock					☐		
		FM	Fracture Multiple	from to o clock within of joint					☑		
		MMC	Material Change	Remarks Concrete					☐		

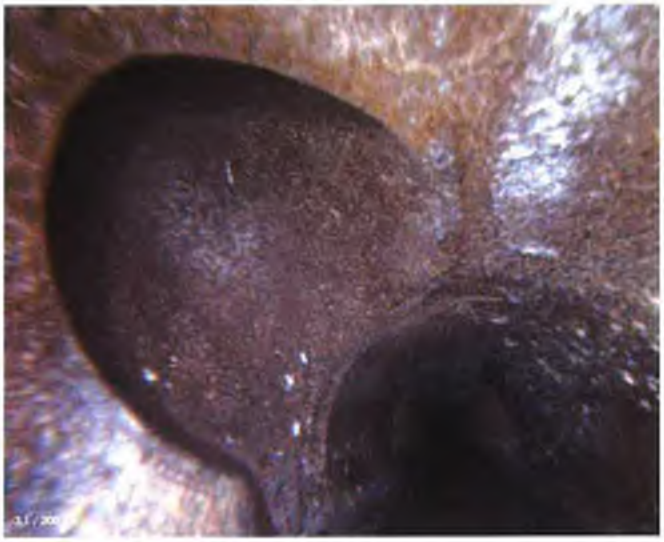
		TBI	Tap Break in Intruding	at o clock NOT within of joint					☐		
		MMC	Material Change	Remarks Vitrified clay					☐		
		TFC	Tap Factory Capped	at o clock					☐		
		MGP	General Photo	Remarks Image of capped tap from rear camera					☐		
		MMC	Material Change	Remarks Concrete					☐		
		MGP	General Photo						☐		
		MMC	Material Change	Remarks Vitrified clay					☐		
		FM	Fracture Multiple	from to o clock within of joint					☑		
		TF	Tap Factory	at o clock					☐		
		CM	Crack Multiple	from to o clock within of joint					☑		
		TF	Tap Factory	at o clock					☐		
		MMC	Material Change	Remarks Concrete					☐		
		MMC	Material Change	Remarks Vitrified clay					☐		
		TF	Tap Factory	at o clock					☐		
		MMC	Material Change	Remarks Concrete					☐		
		TB	Tap Break in	at o clock					☐		
		FM	Fracture Multiple	from to o clock within of joint					☑		
		MMC	Material Change	Remarks Vitrified clay					☐		
		TFC	Tap Factory Capped	at o clock					☐		
		MGP	General Photo	Remarks Image of capped tap from rear camera					☐		
		MMC	Material Change	Remarks Concrete					☐		
		SAP	Surface Aggregate Projecting	from to o clock NOT within of joint End	F				☐		
		MSA	Abandoned Survey	Remarks Unknown					☐		

PACP Code	AMH		
Description	Manhole		
Image Name	f cad b c f f a AMH jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	Begin survey		

PACP Code	**SAP**		
Description	**Surface Aggregate Projecting**		
Image Name	**db d c a b a a fdff SAP jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index	**S**	Within of Joint	
Remarks			

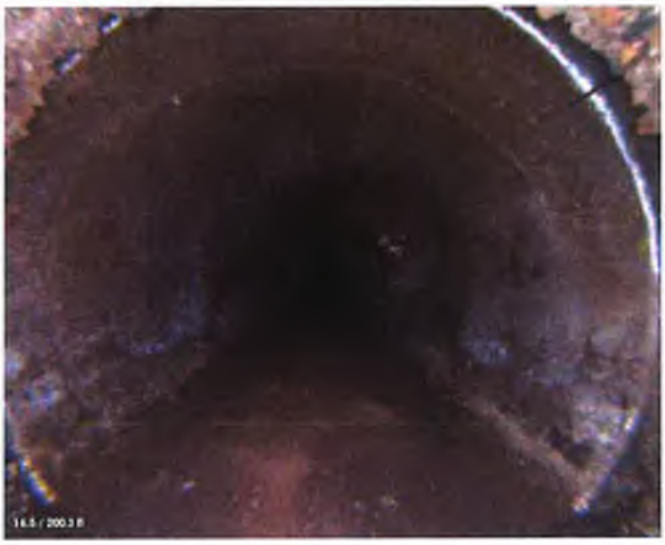
PACP Code	**MWL**		
Description	**Water Level**		
Image Name	**f b cb bc b acb dfdc df MWL jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	
Remarks			

PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**dfbe e e ddab d MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	
Remarks	**Vitrified clay**		



PACP Code	**TF**		
Description	**Tap Factory**		
Image Name	**e e c bc b a d cd f b ac d TF jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**e e bf df f a a MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Concrete**		

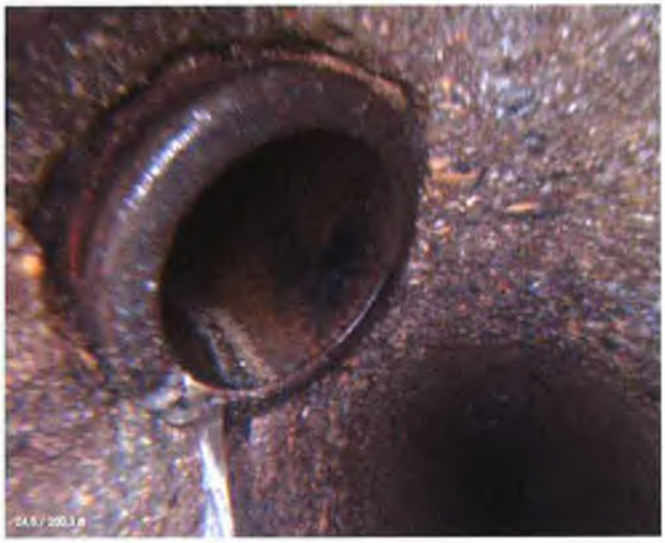


PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**bf dd b bc a e f MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Vitrified clay**		

PACP Code	**FM**		
Description	**Fracture Multiple**		
Image Name	**bc ac fc ae d eb e e FM jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☑
Remarks			

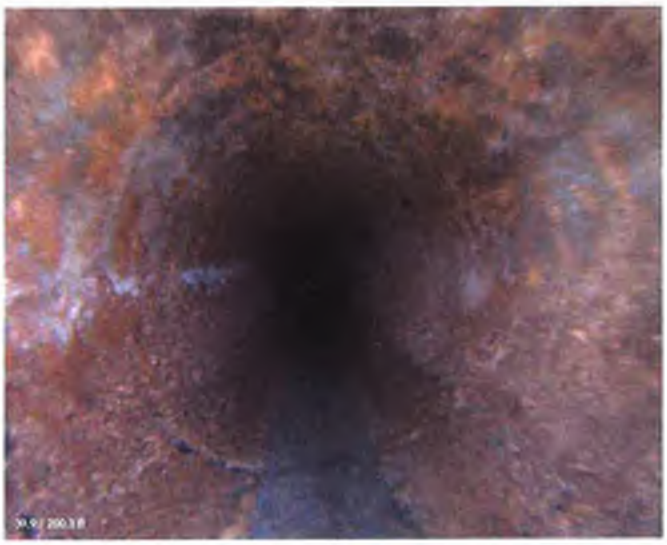
PACP Code	**TFA**		
Description	**Tap Factory Active**		
Image Name	**bb f c b be e TFA jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**cbdb c a a a c f f e e b MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Concrete**		



PACP Code	**TBI**		
Description	**Tap Break in Intruding**		
Image Name	**f a c c ebf TBI jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Tap is active**		

PACP Code	**MWL**		
Description	**Water Level**		
Image Name	**f acad f d f e a cfad ff MWL jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			



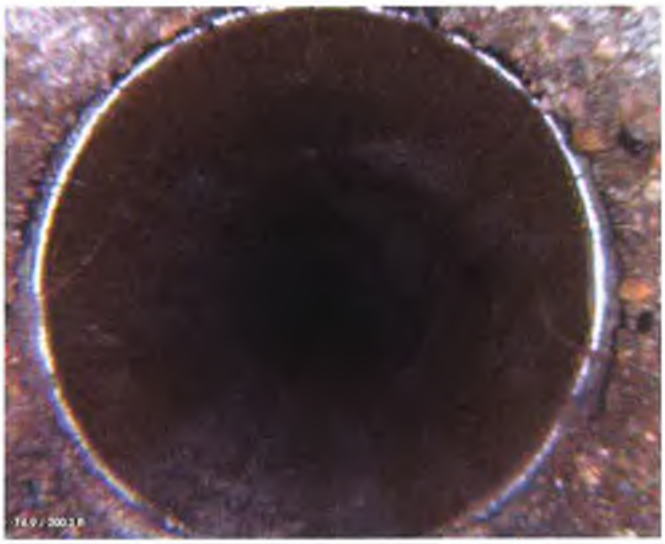
PACP Code	**FC**		
Description	**Fracture Circumferential**		
Image Name	**d fec f b bd af a dd e b FC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

PACP Code	MGP		
Description	General Photo		
Image Name	cf eda cc d c c c b cac MGP jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

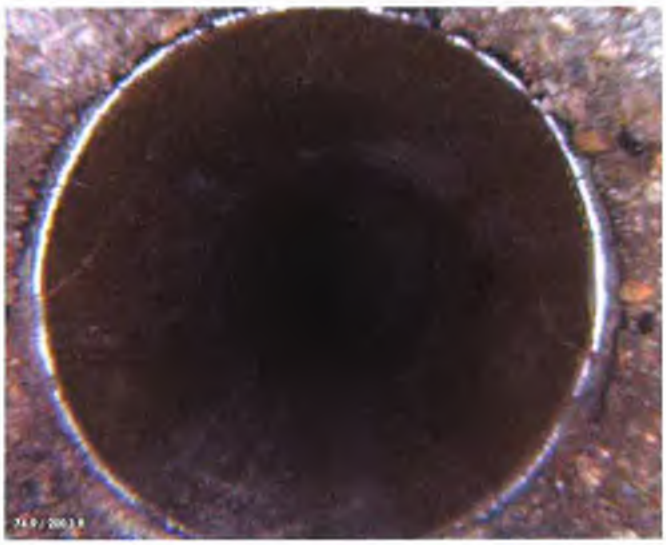
PACP Code	MMC		
Description	Material Change		
Image Name	a b f a f d ddbba f MMC jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	Vitrified clay		

PACP Code	TF		
Description	Tap Factory		
Image Name	c eac f d c a ff TF jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**ec a d a d d daf cd fff MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Concrete**		



PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**eb e b ed b f bcba a c a MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Vitrified clay**		

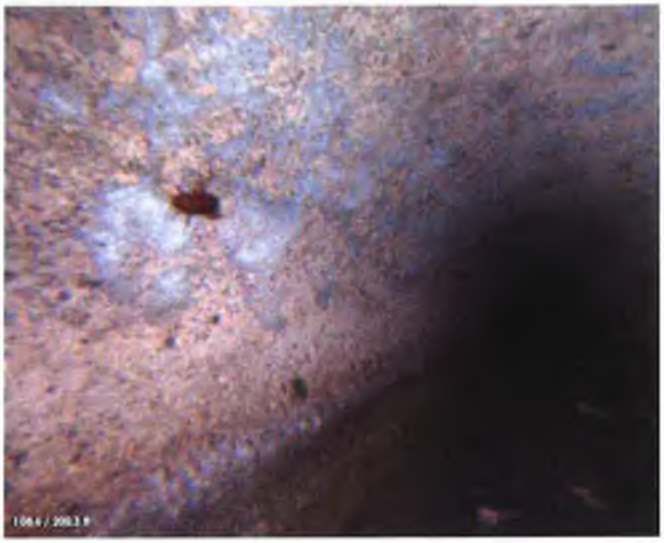


PACP Code	**CM**		
Description	**Crack Multiple**		
Image Name	**f c e fbc e b da f f CM jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☑
Remarks			

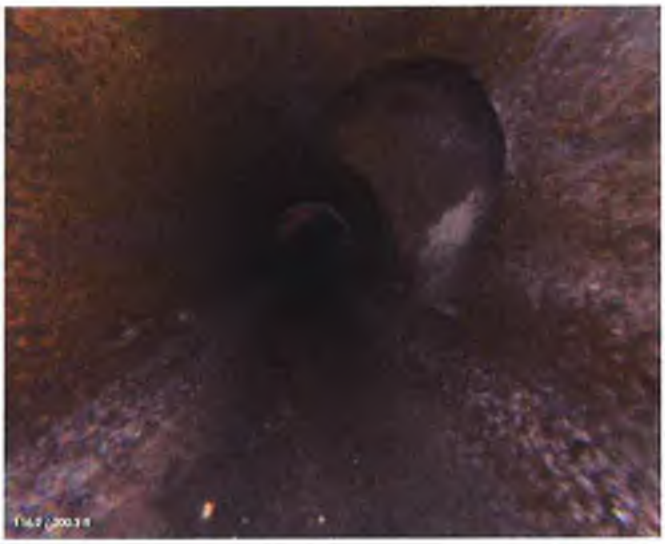
PACP Code	**TFA**		
Description	**Tap Factory Active**		
Image Name	**b b d ff b bd TFA jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**d d c d c bd MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Concrete**		

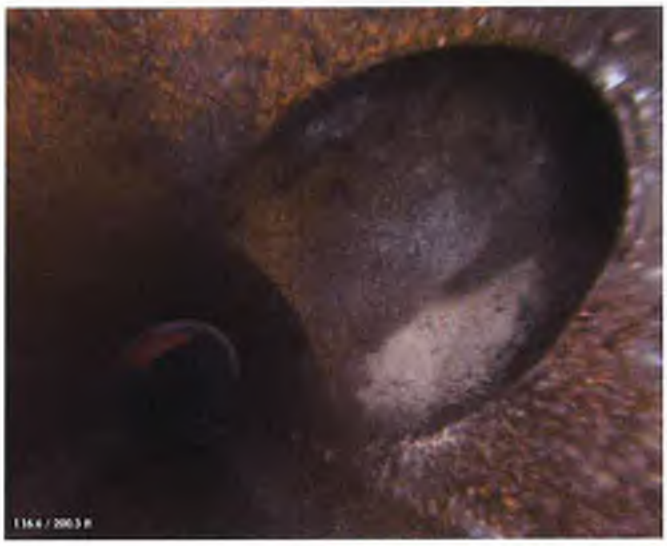
PACP Code	**MGP**		
Description	**General Photo**		
Image Name	**a dc b a bd fcf e f MGP jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			



PACP Code	**VC**		
Description	**Vermin Cockroach**		
Image Name	**decd a a f da dd VC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			



PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**c cff bd f ed cbf f MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Vitrified clay**		

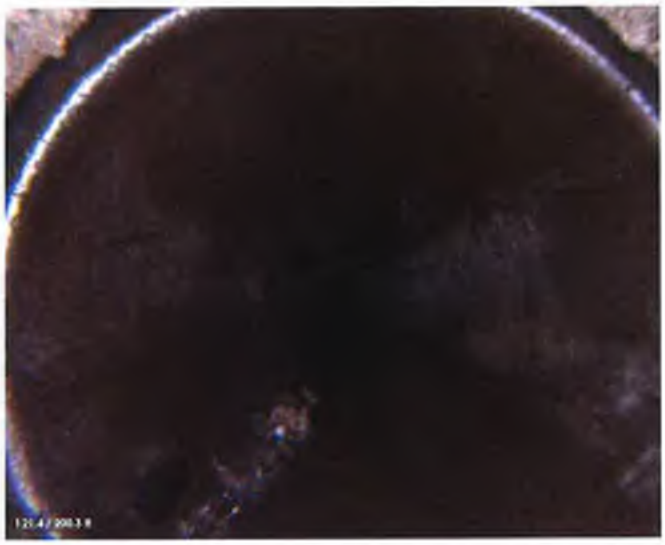


PACP Code	**TFC**		
Description	**Tap Factory Capped**		
Image Name	**c fc e f e a d d c e TFC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

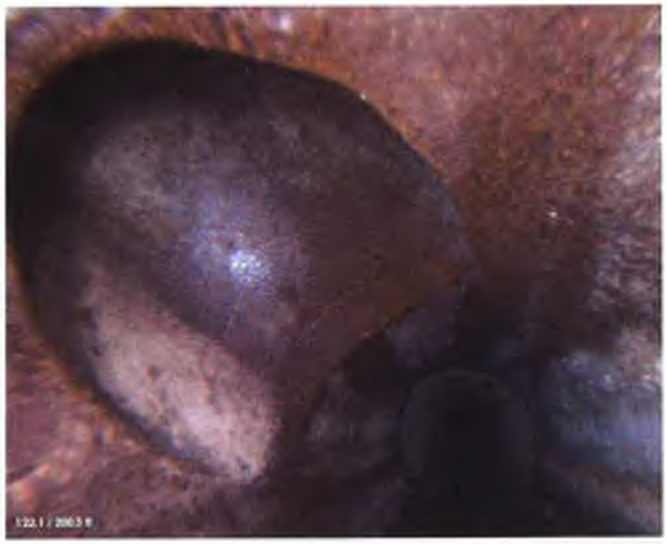
PACP Code	FM		
Description	**Fracture Multiple**		
Image Name	c de a da b a FM jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☑
Remarks			

PACP Code	MMC		
Description	**Material Change**		
Image Name	b b b c e c d d dc MMC jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Concrete**		

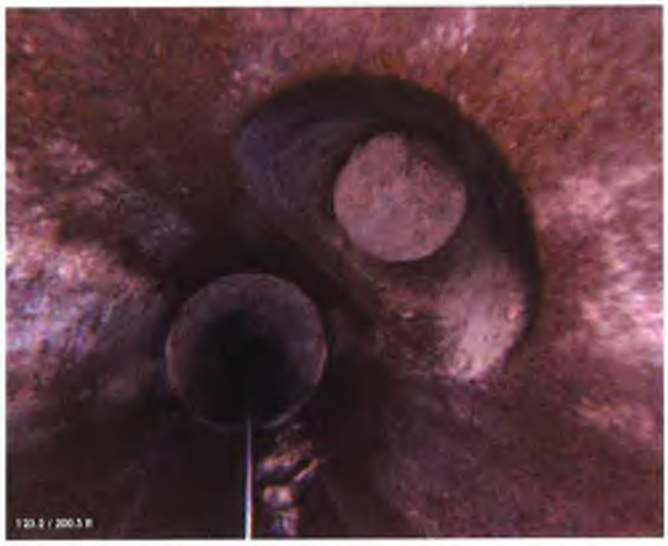
PACP Code	TBI		
Description	**Tap Break in Intruding**		
Image Name	b da c b f bd a f a b c TBI jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			



PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**f d eae ae cb ca efdab b b MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Vitrified clay**		

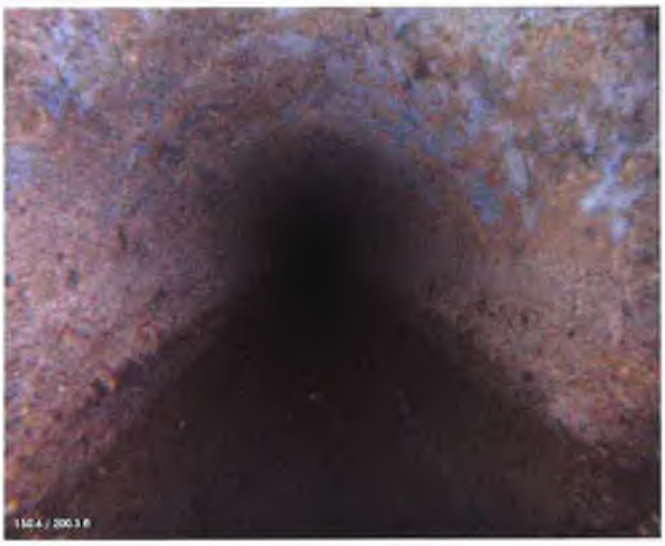


PACP Code	**TFC**		
Description	**Tap Factory Capped**		
Image Name	**a d ba ec eb d TFC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

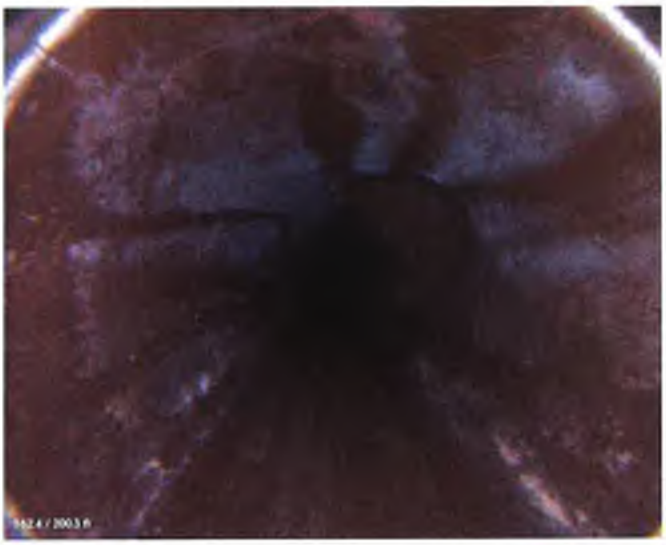


PACP Code	**MGP**		
Description	**General Photo**		
Image Name	**d ca f c f da fe b ccf MGP jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Image of capped tap from rear camera**		

PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**dbfa c b a bf a cc ac MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Concrete**		



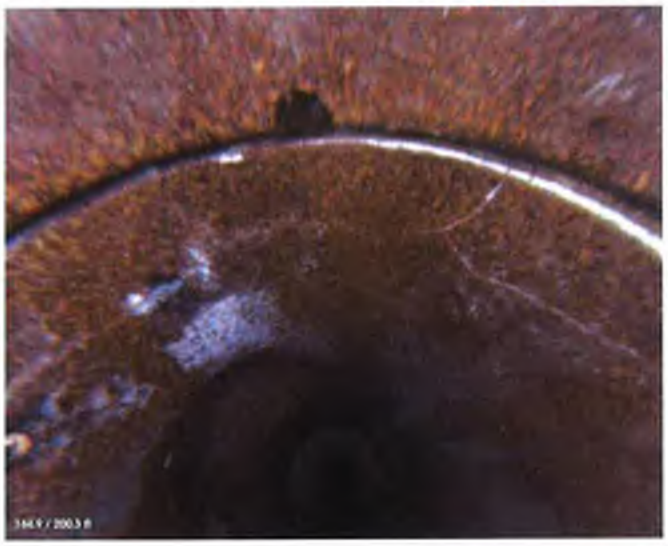
PACP Code	**MGP**		
Description	**General Photo**		
Image Name	**d bc a cd a b fbc f MGP jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			



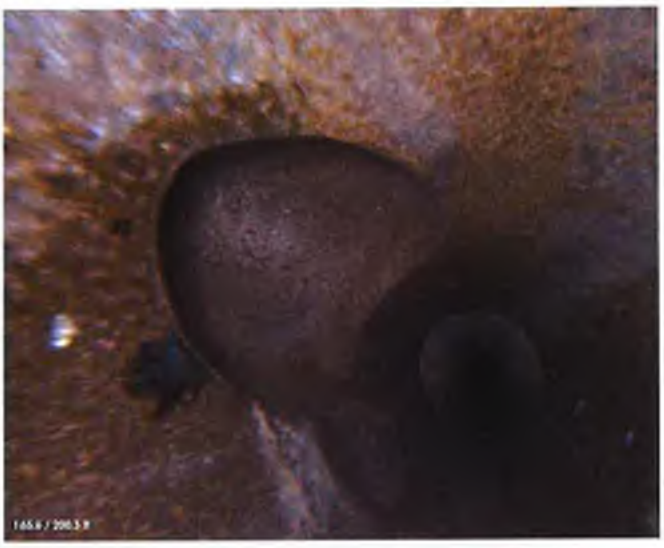
PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**d a ae e fa e d de e MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Vitrified clay**		

PACP Code	FM		
Description	Fracture Multiple		
Image Name	c f dfd b e b d d aacf ab bb FM jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☑
Remarks			

PACP Code	TF		
Description	Tap Factory		
Image Name	d b b b bc e e b b a f TF jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			



PACP Code	CM		
Description	Crack Multiple		
Image Name	e b e a ba b a ea b CM jpg		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☑
Remarks			



PACP Code	TF		
Description	**Tap Factory**		
Image Name	**ed d bd e a a dce d d TF jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

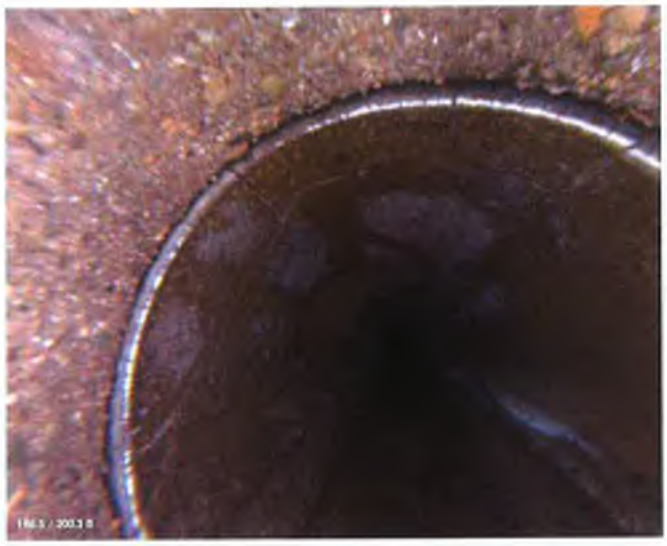
PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**afefd da d ab e ec MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Concrete**		

PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**bf ac c c dfa d MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Vitrified clay**		

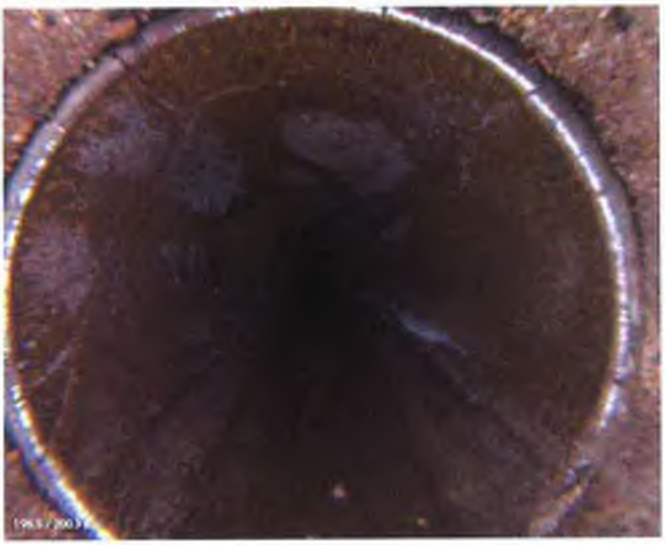
PACP Code	**TF**		
Description	**Tap Factory**		
Image Name	**f ff dd f b ff eae TF jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			

PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**e b c ac b d d c ce ab c MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Concrete**		

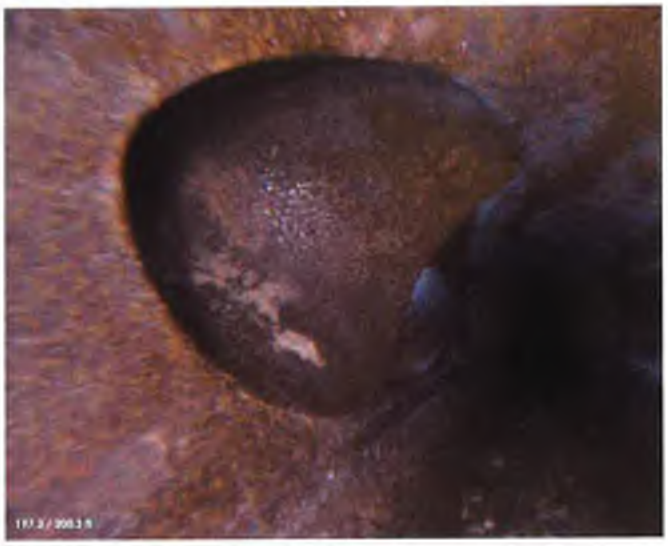
PACP Code	**TB**		
Description	**Tap Break in**		
Image Name	**a d a f e e e f fc f e TB jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			



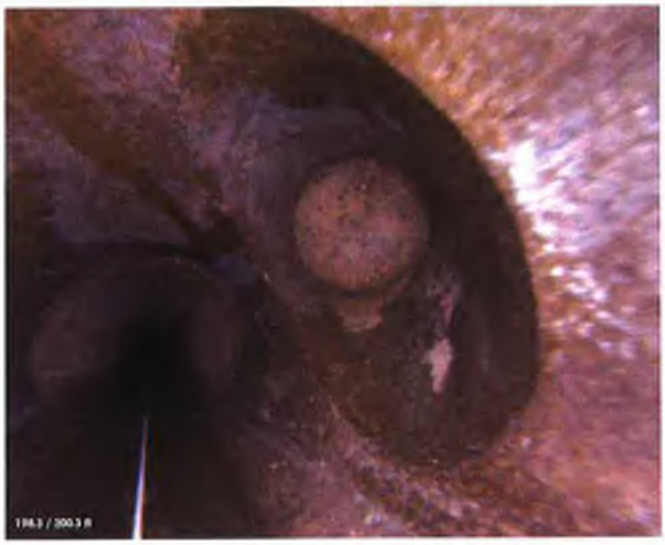
PACP Code	FM		
Description	**Fracture Multiple**		
Image Name	**f b f efc a f f a FM jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☑
Remarks			



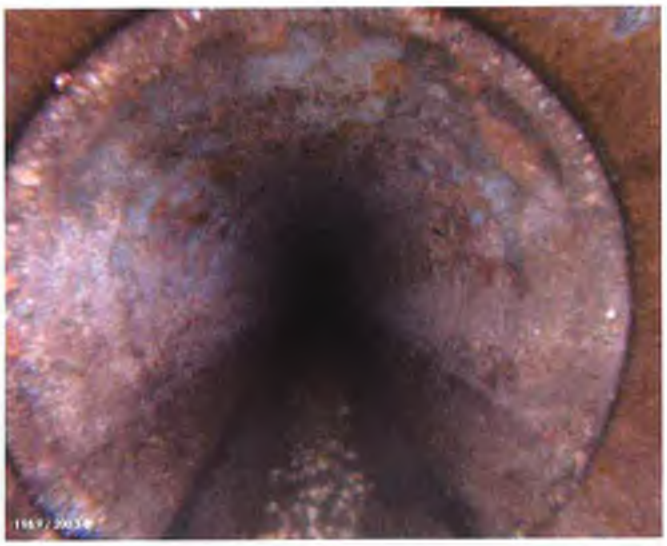
PACP Code	MMC		
Description	**Material Change**		
Image Name	**a f a f a dbf e c MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Vitrified clay**		



PACP Code	TFC		
Description	**Tap Factory Capped**		
Image Name	**db f be b a d bbdc c f TFC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks			



PACP Code	**MGP**		
Description	**General Photo**		
Image Name	**dd cb c d e b b b MGP jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Image of capped tap from rear camera**		



PACP Code	**MMC**		
Description	**Material Change**		
Image Name	**abf caa d e f c e MMC jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Concrete**		

PACP Code	**SAP**		
Description	**Surface Aggregate Projecting**		
Image Name	**ded c a a e ee c SAP jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index	**F**	Within of Joint	☐
Remarks			

PACP Code	**MSA**		
Description	**Abandoned Survey**		
Image Name	**d f ab a e ff f MSA jpg**		
Distance ft			
Structural Grade		Maintenance Grade	
Percent Value			
Clock At From		Clock To	
st Value		nd Value	
Continuous Index		Within of Joint	☐
Remarks	**Unknown**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-2005 to 07-2003	07-2005	07-2003	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		328	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
N Hill St	City of Arvin	Light Highway	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	01:20 PM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		328
Media Label	Reverse Setup	Work Order No	Additional Info	
NS19-1443	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
326	322	4
Overall Index	Structural Index	Maintenance Index
3.23	3.25	2
Overall Quick	Structural Quick	Maintenance Quick
4D3N	4D3M	3111

Recommendation

- due to no CCTV, open trench pipe replacement (331*)

07-2005

Camera Direction

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 15% of cross sectional area
3	0	[SAP] Surface Aggregate Projecting from 7 to 5 o'clock NOT within 8" of joint Start
1	0.8	[VC] Vermin Cockroach NOT within 8" of joint
-	10.4	[MWL] Water Level 5% of cross sectional area
-	42.8	[MWL] Water Level 20% of cross sectional area
-	50.2	[MWL] Water Level 30% of cross sectional area
-	50.9	[MGP] General Photo
3	53.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	62.4	[FL] Fracture Longitudinal at 2 o'clock within 8" of joint
-	76	[MWL] Water Level 5% of cross sectional area
-	85.2	[MWL] Water Level 15% of cross sectional area
3	89.4	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint
-	96.5	[MWL] Water Level 5% of cross sectional area
-	98.7	[MWL] Water Level 15% of cross sectional area
-	100.7	[MGP] General Photo
4	101.3	[FM] Fracture Multiple from 9 to 10 o'clock within 8" of joint
4	113.2	[FM] Fracture Multiple from 2 to 4 o'clock within 8" of joint
-	114	[TFC] Tap Factory Capped at 10 o'clock
-	114.8	[MGP] General Photo Remarks: Image of capped tap from rear camera
3	125.4	[TBI] Tap Break-in Intruding at 12 o'clock NOT within 8" of joint
-	137.3	[TFC] Tap Factory Capped at 10 o'clock
-	138.1	[MGP] General Photo Remarks: Image of capped tap from rear camera
3	160.1	[FL] Fracture Longitudinal at 2 o'clock within 8" of joint
4	181	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint
4	187	[FM] Fracture Multiple from 12 to 1 o'clock within 8" of joint
3	198.9	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	200.2	[MGP] General Photo
-	205.4	[MWL] Water Level 25% of cross sectional area
4	207.8	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint
-	208.4	[TF] Tap Factory at 10 o'clock
4	219.3	[FM] Fracture Multiple from 9 to 1 o'clock within 8" of joint
3	225.2	[FL] Fracture Longitudinal at 10 o'clock within 8" of joint
4	231.1	[FM] Fracture Multiple from 12 to 3 o'clock within 8" of joint
4	237.1	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint
4	240.2	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint
3	243.1	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	246.2	[FL] Fracture Longitudinal at 9 o'clock within 8" of joint
4	248.9	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint Start
-	250.2	[MGP] General Photo

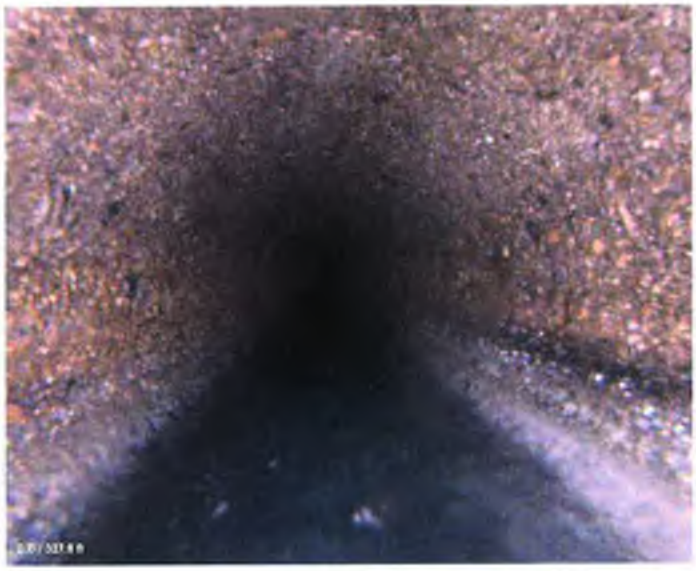
-	300.5	[MGP] General Photo
4	327.8	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint End
3	327.8	[SAP] Surface Aggregate Projecting from 7 to 5 o'clock NOT within 8" of joint End
-	327.8	[AMH] Manhole Remarks: End of survey

Condition Observations:

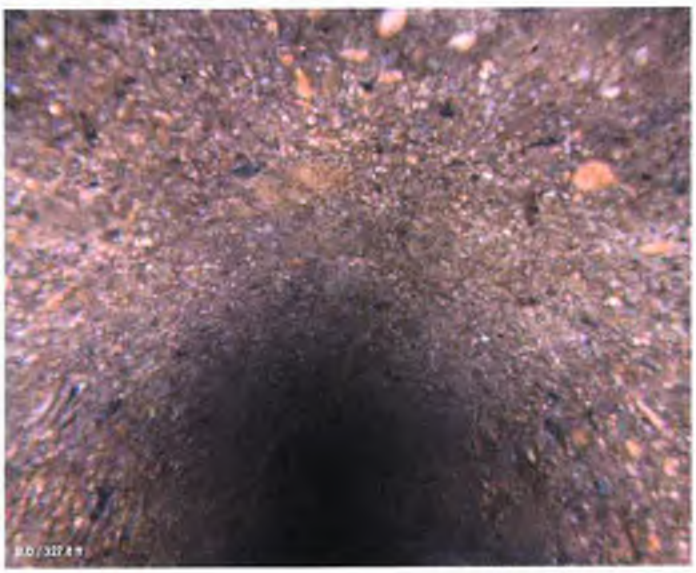
Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	15% of cross sectional area				15	☐		
3	0	SAP	Surface Aggregate Projecting	from 7 to 5 o'clock NOT within 8" of joint Start	S01				☐	7	5
1	0.8	VC	Vermin Cockroach	NOT within 8" of joint					☐		
-	10.4	MWL	Water Level	5% of cross sectional area				5	☐		
-	42.8	MWL	Water Level	20% of cross sectional area				20	☐		
-	50.2	MWL	Water Level	30% of cross sectional area				30	☐		
-	50.9	MGP	General Photo						☐		
3	53.4	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	62.4	FL	Fracture Longitudinal	at 2 o'clock within 8" of joint					☑	2	
-	76	MWL	Water Level	5% of cross sectional area				5	☐		
-	85.2	MWL	Water Level	15% of cross sectional area				15	☐		
3	89.4	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
-	96.5	MWL	Water Level	5% of cross sectional area				5	☐		
-	98.7	MWL	Water Level	15% of cross sectional area				15	☐		
-	100.7	MGP	General Photo						☐		
4	101.3	FM	Fracture Multiple	from 9 to 10 o'clock within 8" of joint					☑	9	10
4	113.2	FM	Fracture Multiple	from 2 to 4 o'clock within 8" of joint					☑	2	4
-	114	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	114.8	MGP	General Photo	Remarks: Image of capped tap from rear camera					☐		
3	125.4	TBI	Tap Break-in Intruding	at 12 o'clock NOT within 8" of joint		4	1		☐	12	
-	137.3	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	138.1	MGP	General Photo	Remarks: Image of capped tap from rear camera					☐		
3	160.1	FL	Fracture Longitudinal	at 2 o'clock within 8" of joint					☑	2	
4	181	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
4	187	FM	Fracture Multiple	from 12 to 1 o'clock within 8" of joint					☑	12	1
3	198.9	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	200.2	MGP	General Photo						☐		
-	205.4	MWL	Water Level	25% of cross sectional area				25	☐		
4	207.8	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
-	208.4	TF	Tap Factory	at 10 o'clock		4			☐	10	

4	219.3	FM	Fracture Multiple	from 9 to 1 o'clock within 8" of joint					☑	9	1
3	225.2	FL	Fracture Longitudinal	at 10 o'clock within 8" of joint					☑	10	
4	231.1	FM	Fracture Multiple	from 12 to 3 o'clock within 8" of joint					☑	12	3
4	237.1	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
4	240.2	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
3	243.1	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	246.2	FL	Fracture Longitudinal	at 9 o'clock within 8" of joint					☑	9	
4	248.9	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint Start	S02				☑	10	2
-	250.2	MGP	General Photo						☐		
-	300.5	MGP	General Photo						☐		
4	327.8	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint End	F02				☑	10	2
3	327.8	SAP	Surface Aggregate Projecting	from 7 to 5 o'clock NOT within 8" of joint End	F01				☐	7	5
-	327.8	AMH	Manhole	Remarks: End of survey					☐		

PACP Code:	AMH		
Description:	Manhole		
Image Name:	4240049c-7499-4d43-b0dc-d9b92bd01141_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		



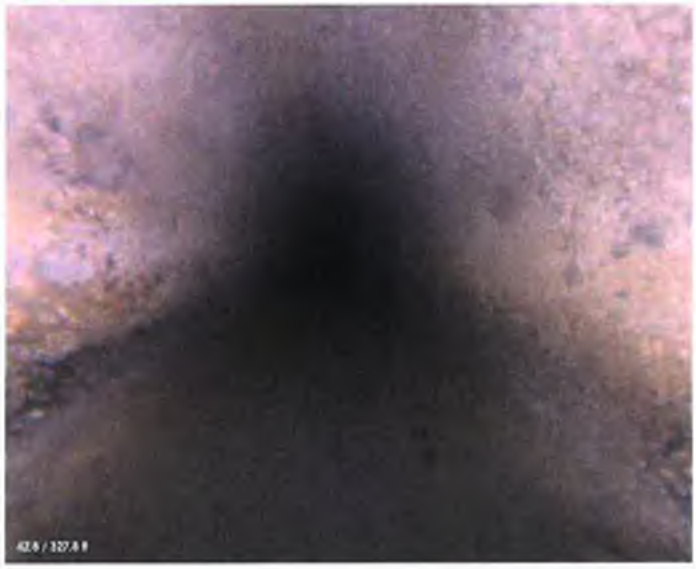
PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**9406f44c-ade7-436c-879b-c70f304b5656_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**15**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**01547b9e-4b53-45ff-a8da-e27fdfc43a3b_0-SAP.jpg**		
Distance (ft):	**0**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**7**	Clock To:	**5**
1st Value:		2nd Value:	
Continuous Index:	**S01**	Within 8" of Joint:	☐
Remarks:			

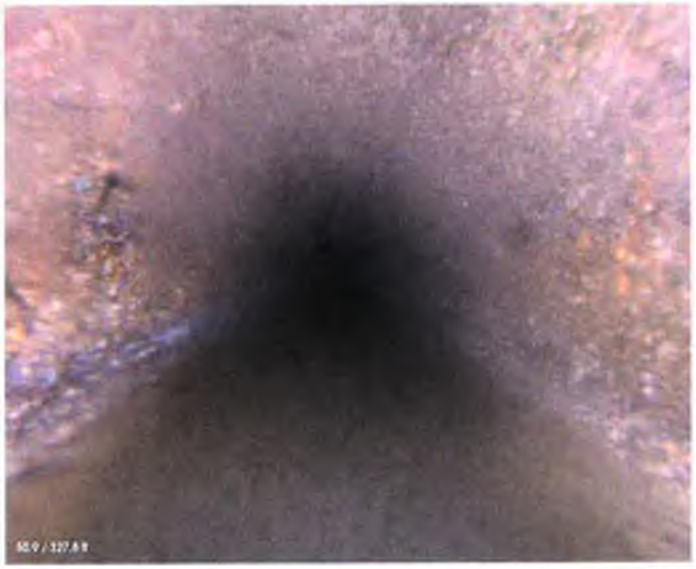
PACP Code:	**VC**		
Description:	**Vermin Cockroach**		
Image Name:	**c370ff38-ecd4-4e91-bd6b-799529932a6b_0.8-VC.jpg**		
Distance (ft):	**0.8**		
Structural Grade:	**0**	Maintenance Grade	**1**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	cd118568-0761-47ea-a313-c388664b0e32_10.4-MWL.jpg		
Distance (ft):	10.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



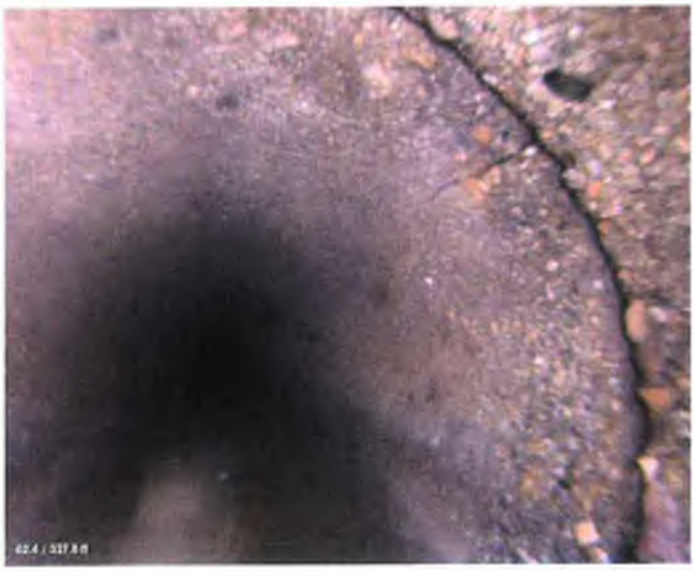
PACP Code:	MWL		
Description:	Water Level		
Image Name:	cc39cb1e-a2fe-4877-9d73-7693b3e9ba90_42.8-MWL.jpg		
Distance (ft):	42.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	20		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	3b95e240-2cc0-45a9-9a28-cb1331629969_50.2-MWL.jpg		
Distance (ft):	50.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	30		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

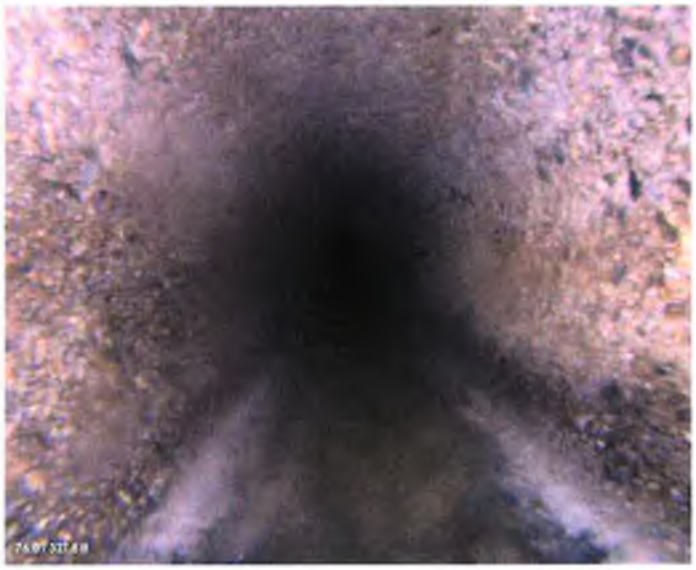


PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**d7181513-7eea-4c85-8744-fb55cd5b033a_50.9-MGP.jpg**		
Distance (ft):	**50.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**7ae61092-7811-4f0d-ac5b-2b03eba75643_53.4-FL.jpg**		
Distance (ft):	**53.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

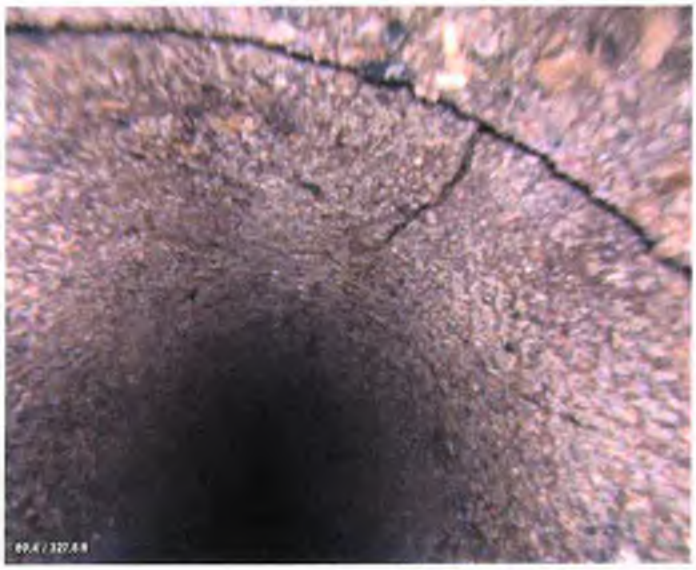


PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**f43e4e33-e93e-4bc6-9878-bd9814ac5db1_62.4-FL.jpg**		
Distance (ft):	**62.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	MWL		
Description:	Water Level		
Image Name:	cf80ccf5-3b71-4f5c-832b-11c0f909fe77_76-MWL.jpg		
Distance (ft):	76		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	a84f3f2e-5731-4c66-9d32-c4e1f74245f7_85.2-MWL.jpg		
Distance (ft):	85.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	15		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



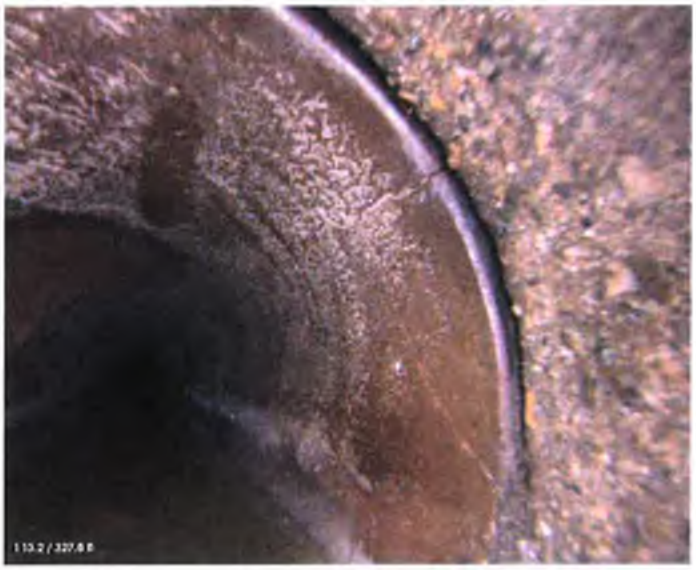
PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	3dd83447-8f6e-405b-9bd8-2a5ac7c82d51_89.4-FL.jpg		
Distance (ft):	89.4		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	de91323c-cfde-42db-bf7b-edaee2daba69_96.5-MWL.jpg		
Distance (ft):	96.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	7d7c0e71-0f42-40f3-8ce2-e9dec4073e47_98.7-MWL.jpg		
Distance (ft):	98.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	15		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

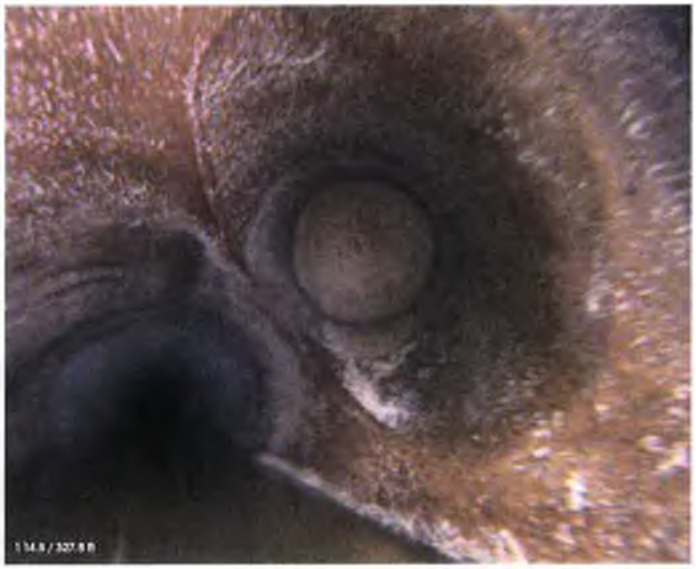
PACP Code:	MGP		
Description:	General Photo		
Image Name:	07a17ebe-40d6-4fd9-a3a5-4fa65c1c3faa_100.7-MGP.jpg		
Distance (ft):	100.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**1f2b8ed8-1f3f-4c32-9048-4db24c50f052_101.3-FM.jpg**		
Distance (ft):	**101.3**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**10**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



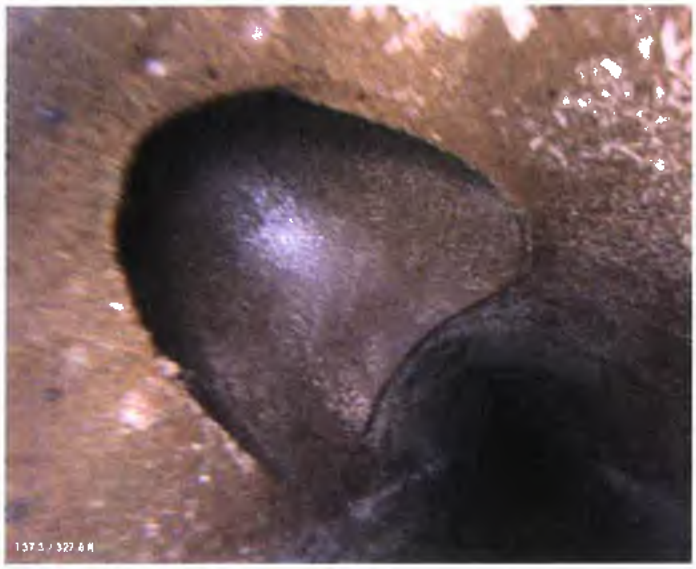
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**0ef2a8bd-fca3-40a5-b551-5ba9c037e156_113.2-FM.jpg**		
Distance (ft):	**113.2**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TFC		
Description:	**Tap Factory Capped**		
Image Name:	**a4e60816-f945-45ce-8983-f6bb13cdb94b_114-TFC.jpg**		
Distance (ft):	**114**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



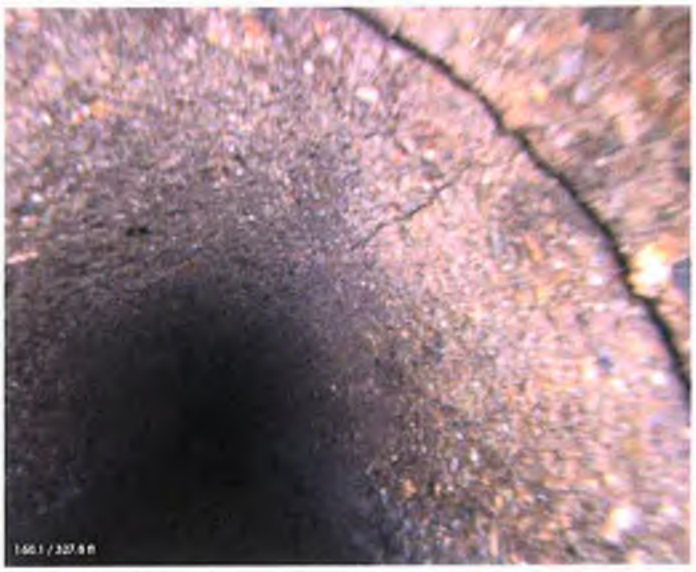
PACP Code:	MGP		
Description:	General Photo		
Image Name:	9151583b-8d8c-4d15-8148-ad7a70884391_114.8-MGP.jpg		
Distance (ft):	114.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Image of capped tap from rear camera		

PACP Code:	TBI		
Description:	Tap Break-in Intruding		
Image Name:	32936530-c90b-4c45-b280-fbc0b9260c9c_125.4-TBI.jpg		
Distance (ft):	125.4		
Structural Grade:	0	Maintenance Grade	3
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:	4	2nd Value:	1
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	e47d07b6-a3ef-4094-9c2e-f9cf9081867e_137.3-TFC.jpg		
Distance (ft):	137.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

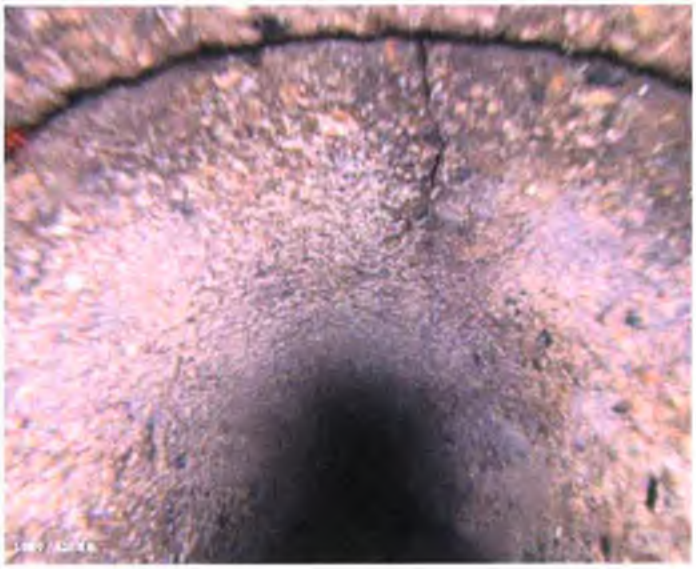
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**6f449233-f957-40d5-a721-2e8655fe934a_138.1-MGP.jpg**		
Distance (ft):	**138.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Image of capped tap from rear camera**		



PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**0fd608d3-d75f-4fbe-97b9-f5776796285b_160.1-FL.jpg**		
Distance (ft):	**160.1**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

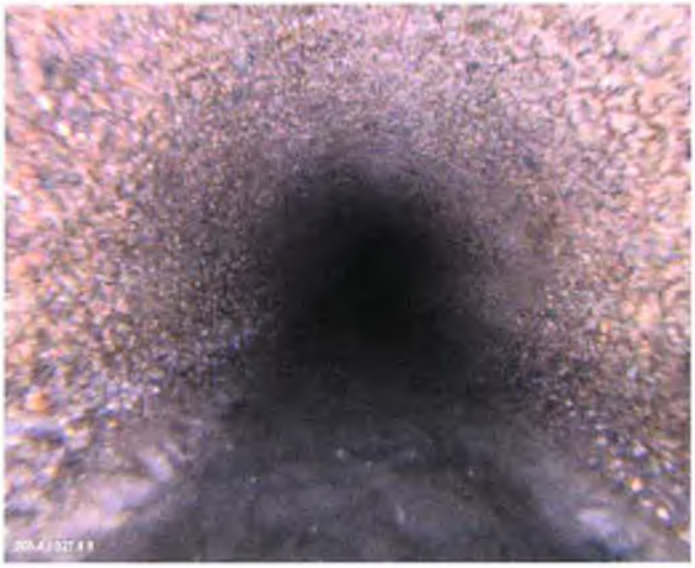
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**fd911b95-cbb0-4629-8fff-844ac1008913_181-FM.jpg**		
Distance (ft):	**181**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**7498b00b-a6fd-40c1-8d62-89dbabf42d76_187-FM.jpg**		
Distance (ft):	**187**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



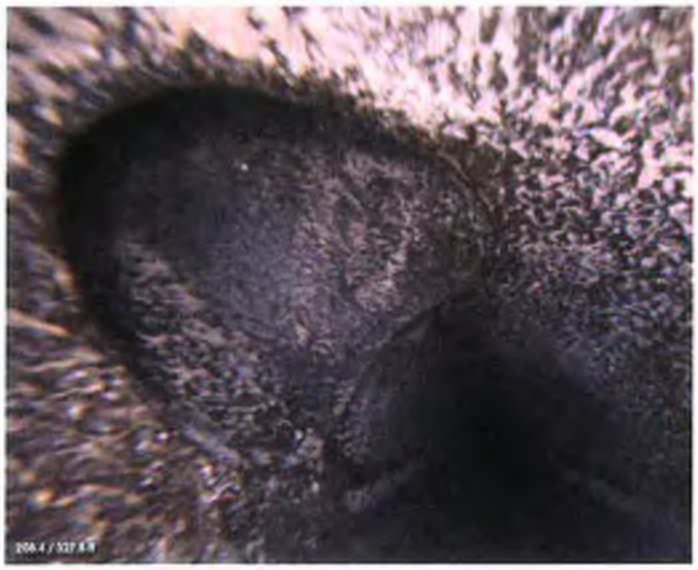
PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**4a9be5ad-57de-4441-b3b5-bcf1b2d815a3_198.9-FL.jpg**		
Distance (ft):	**198.9**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**12a941f7-c09d-4101-a663-c2fe5f21b9e9_200.2-MGP.jpg**		
Distance (ft):	**200.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



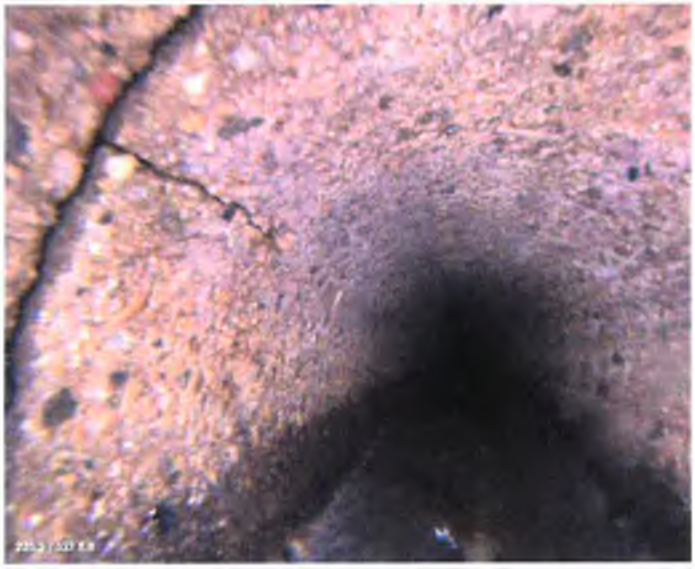
PACP Code:	MWL		
Description:	Water Level		
Image Name:	518eeed6-8f86-45cb-b9b7-23439fd98264_205.4-MWL.jpg		
Distance (ft):	205.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	25		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	54ffc208-f713-4803-a99a-1bc9736cb10a_207.8-FM.jpg		
Distance (ft):	207.8		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	1
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	TF		
Description:	Tap Factory		
Image Name:	ad69cb2d-caec-4b53-b878-02c6870cf508_208.4-TF.jpg		
Distance (ft):	208.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

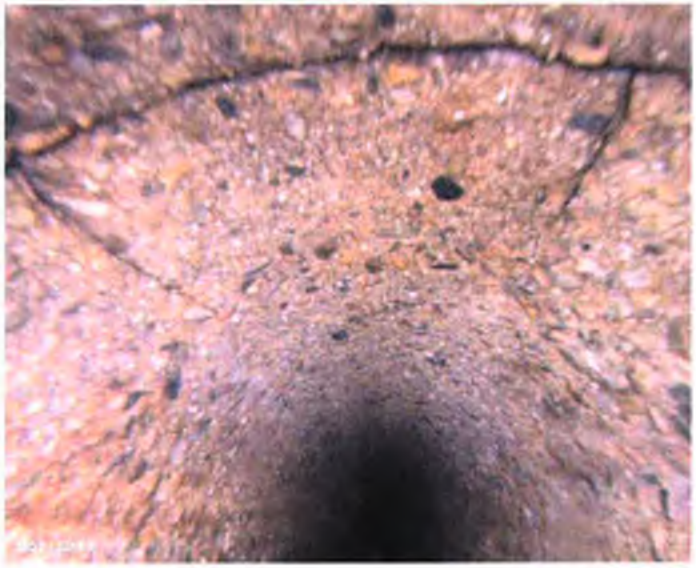
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**b20c34ad-45a0-4491-b923-2fd2f7eb1313_219.3-FM.jpg**		
Distance (ft):	**219.3**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



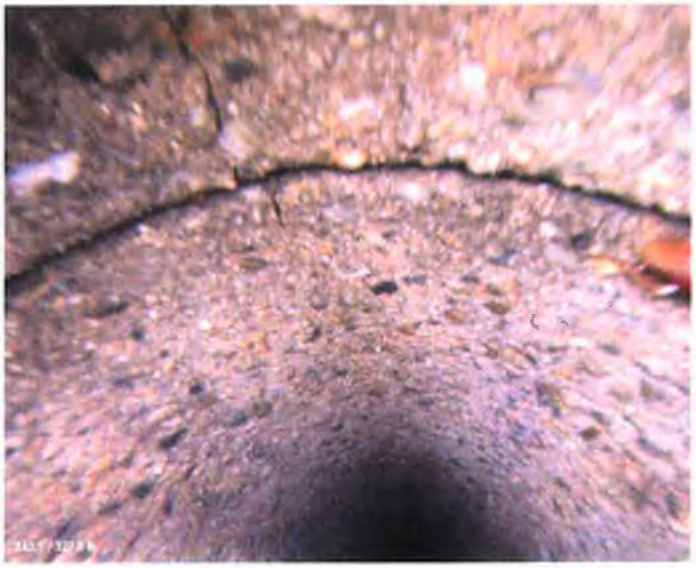
PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**0cb3a564-bfec-44f3-b582-62e9d2028667_225.2-FL.jpg**		
Distance (ft):	**225.2**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**3bf71405-c153-48e7-a4ca-4589d1381d10_231.1-FM.jpg**		
Distance (ft):	**231.1**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

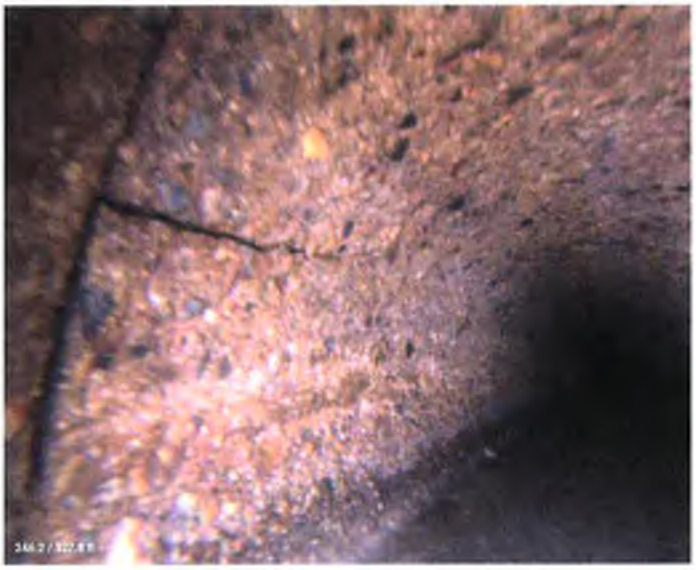
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**e6c72320-8a30-4b1e-8abf-745ae10ebe55_237.1-FM.jpg**		
Distance (ft):	**237.1**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



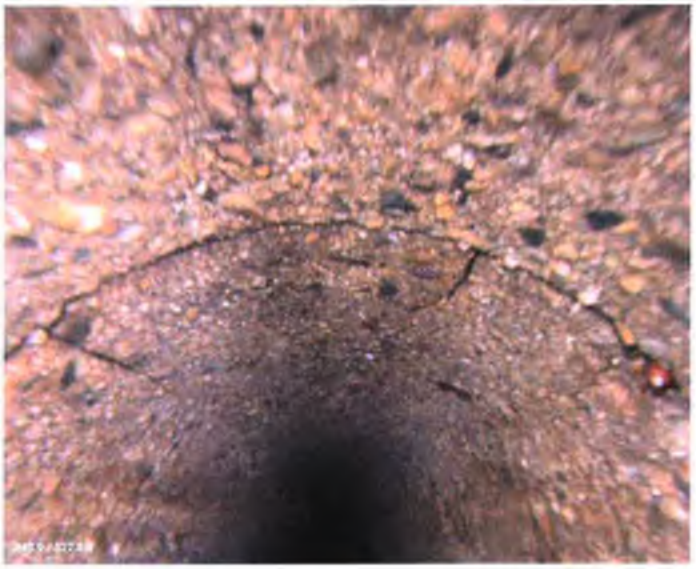
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**dca9b690-87fb-43f2-b239-2c254da311c9_240.2-FM.jpg**		
Distance (ft):	**240.2**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**38f0178e-9b39-424a-b954-d8d1ecd3417f_243.1-FL.jpg**		
Distance (ft):	**243.1**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**5ebf8551-8d2a-4a52-a1dc-0e9f993cc40c_246.2-FL.jpg**		
Distance (ft):	**246.2**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

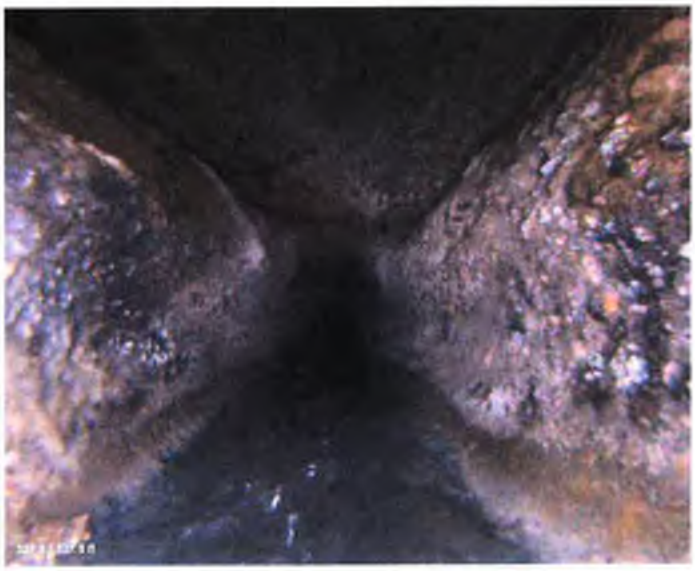


PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**2304ef3c-dea0-46f5-b8d4-3be1d36be143_248.9-FM.jpg**		
Distance (ft):	**248.9**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:	**S02**	Within 8" of Joint:	☑
Remarks:			

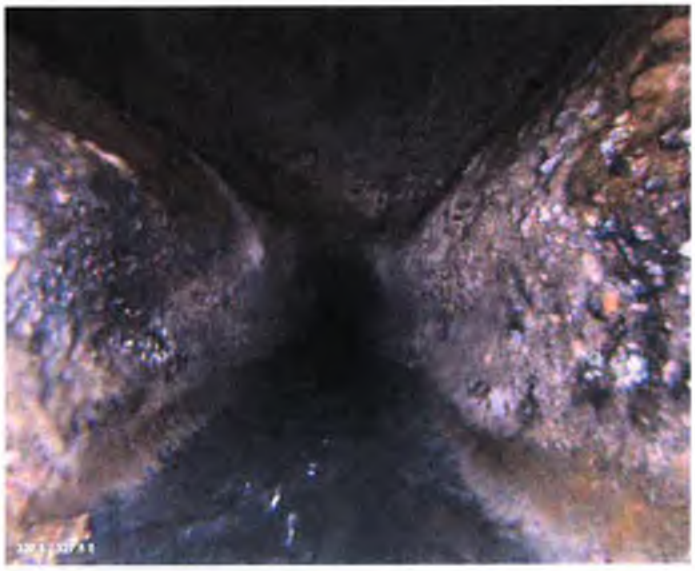
PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**a551e48e-9581-47ad-9d3e-8369cb2687d2_250.2-MGP.jpg**		
Distance (ft):	**250.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**7f789ede-04d6-4c61-b0b8-d6d659523d88_300.5-MGP.jpg**		
Distance (ft):	**300.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**30da6999-75cd-454e-83ba-0d704e3f32c8_327.8-FM.jpg**		
Distance (ft):	**327.8**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:	**F02**	Within 8" of Joint:	☑
Remarks:			



PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**8d100abd-0979-41c4-bfb0-57183ed40e1c_327.8-SAP.jpg**		
Distance (ft):	**327.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**7**	Clock To:	**5**
1st Value:		2nd Value:	
Continuous Index:	**F01**	Within 8" of Joint:	☐
Remarks:			



PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**e5bfd3dc-ae65-404b-8c01-f2020c90c330_327.8-AMH.jpg**		
Distance (ft):	**327.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

2 videos (2015)

CCTV Observation Report

Harris & Associates

Date: 11/13/15
Pipe Length
Customer:

Owner: City of Arvin
Surveyor:
Weather: Dry

Pre Clean: N/A
Shape: Circular
Reach: 07-2004 to 07-2003

Street: North Hill Street
City: Arvin
Use: Sanitary

Flow Control: Not Controlled
Dia/Height (in): 8
Material: Concrete Pipe

Survey Direction: Downstream

US Manhole: 07-2004
DS Manhole: 07-2003
Total Length Surveyed: 614.5

Joint every 3ft

Position	Code	Observation	Video (sec)	Grade
0	MWL	Water Level (5%)		N/A
4.3	OBN	Obstacle Construction Debris		M3
7	CC	Crack Circumfrential (@ Joint)		S2
13	TFA	Tap Factory Active		
17	SS	Surface Spalling		S3
22.3	TFC	Tap Factory Capped		
27.5	TB	Tap Break In		
65	TB	Tap Break In		
70.2	TF	Tap Factory		
73	TF	Tap Factory		
85.4	FC	Fracture Circumfrential		S3
86	CM	Crack Multiple (@ joint)		S2
87.5	TFA	Tap Factory Active		N/A
		* Tap is offset		
121.8	CM	Crack Multiple		S3
123.2	TFC	Tap Factory Capped		
133.1	TB	Tap Break In		
139.3	CM	Crack Multiple.		S3
141	TF	Tap Factory		
		* Tap is offset		
172.1	CC	Crack Circumfrential		S3
173.5	TFC	Tap Factory Capped		
209	TFC	Tap Factory Capped		
211.5	TBA	Tap Break-In Active (WL = 15%)		
223	CM	Crack Multiple		S3
223.9	TF	Tap Factory		
237	OBJ	Obstacle in Joint		M2
238.3	TFC	Tap Factory Capped		
241.2	TB	Tap Break In		
248.3	OBN	Obstacle Pipe Material		M3
448.4	CI	Crack Circumfrential		S3
449.9	TFC	Tap Factory Capped		

Recommendation

CIPP entire length, Spot Repair: Sag 592 to MH 07-2003 (23ft)

Continued.....

CCTV Observation Report

Harris & Associates

Date:	Owner:	Pre Clean:
Pipe Length	Surveyor:	Shape:
Customer:	Weather:	Reach:

Street:	Flow Control:	
City:	Dia/Height (in):	
Use:	Material:	Survey Direction:
US Manhole:	DS Manhole:	Total Length Surveyed: 614.5

Position	Code	Observation	Video (sec)	Grade
266.1	CC	Crack Circumfrential (within joint)		S3
267.2	TFC	Tap Factory Capped		
270	TB	Tap Break In		
295	CC	Crack Circumfrential (w/i joint)		S3
296.7	TF	Tap Factory - Joint offset and crack		
321.3	CC	Crack Circumfrential (@ Joint) 322		S3
323.2	TF	Tap Factory		
327	TB	Tap Break In - Tap Crack and Offset		
343.9	TB	Tap Break In		
351.2	CC	Crack Circumfrential		S3
352.6	TF	Tap Factory		
375.2	CC	Crack Circumfrential @ Joint		S2
376.5	TFC	Tap Factory Capped		
421.2	TFC	Tap Factory Capped		
424.5	TBA	Tap Break In Active		
425	CC	Crack Circumfrential (J 425-428)		S3
426.9	TF	Tap Factory		
440	CC	Crack Circumfrential (@ joint)		S3
441.2	TFC	Tap Factory Capped		
443.4	TB	Tap Break In		
445.5	CC	Crack Circumfrential		S3
446.8	TFC	Tap Factory Capped		
468.3	TB	Tap Break In		
483.6	TF	Tap Factory		
489.4	TB	Tap Break-In		
490	CC	Crack Circumfrential		S3
491.6	TFC	Tap Factory Capped		

CCTV Observation Report

Harris & Associates

Date:	Owner:	Pre Clean:
Pipe Length	Surveyor:	Shape:
Customer:	Weather:	Reach:

Street:	Flow Control:	
City:	Dia/Height (in):	
Use:	Material:	Survey Direction:
US Manhole:	DS Manhole:	Total Length Surveyed: 614.5

Position	Code	Observation	Video (sec)	Grade
523.9	TFC	Tap Factory Capped		
544.1	TB	Tap Break In		
547	CC	Crack Circumfrential (on Joint 547)		S3
547.6	TFC	Tap Factory Capped		
590	DSF	Deposits Settled (Fine)		M3
592	MWLS	Water Level Sag (22.5 ft sag) to manhole		S2

- 25 Taps/Laterals to be reinstated
- cracks at various material changes / before Tap factories.
- not noted but surface aggregate visible

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-2004 to 07-2003	07-2004	07-2003	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		0	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North Hill St	City of Arvin	Light Highway	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	01:42 PM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		447
Media Label	Reverse Setup	Work Order No	Additional Info	
NS6-1461	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
305	295	10
Overall Index	Structural Index	Maintenance Index
2.99	3.01	2.5
Overall Quick	Structural Quick	Maintenance Quick
423R	423R	3311

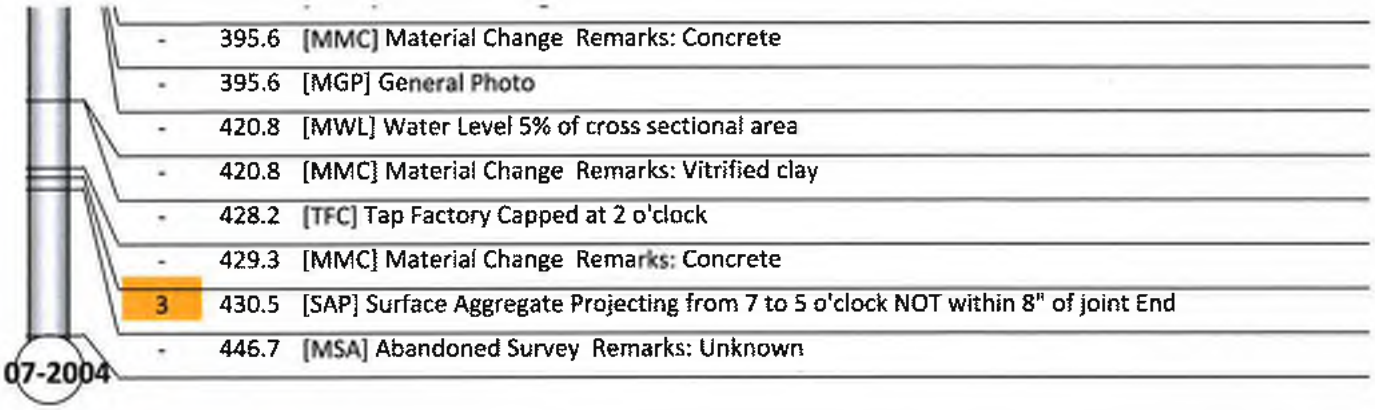
* only Report
NO Video in file

07-2003

Camera Direction

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 40% of cross sectional area
3	0	[SAP] Surface Aggregate Projecting from 7 to 5 o'clock NOT within 8" of joint Start
1	16.9	[VC] Vermin Cockroach NOT within 8" of joint
-	16.9	[MWL] Water Level 50% of cross sectional area
-	50.5	[MGP] General Photo
-	61.1	[MMC] Material Change Remarks: Vitrified clay
-	62.4	[TFC] Tap Factory Capped at 10 o'clock
2	63.5	[CL] Crack Longitudinal at 12 o'clock within 8" of joint
-	63.7	[MMC] Material Change Remarks: Concrete
-	65.4	[TB] Tap Break-in at 11 o'clock
-	84.2	[MMC] Material Change Remarks: Vitrified clay
-	85.6	[TFC] Tap Factory Capped at 2 o'clock
-	86.9	[MMC] Material Change Remarks: Concrete
3	92.4	[FL] Fracture Longitudinal at 10 o'clock within 8" of joint
-	100.1	[MGP] General Photo
3	116.1	[FL] Fracture Longitudinal at 10 o'clock within 8" of joint
-	116.5	[MMC] Material Change Remarks: Vitrified clay
-	117.8	[TFC] Tap Factory Capped at 10 o'clock
3	118.7	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint
-	119	[MMC] Material Change Remarks: Concrete
-	119.5	[TB] Tap Break-in at 12 o'clock
-	125.2	[TBA] Tap Break-in Active at 10 o'clock
-	140	[TB] Tap Break-in at 1 o'clock
3	142.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	150.5	[MGP] General Photo
-	160.4	[MMC] Material Change Remarks: Vitrified clay
-	161.7	[TFC] Tap Factory Capped at 10 o'clock
-	163	[MMC] Material Change Remarks: Concrete
-	165.1	[TB] Tap Break-in at 12 o'clock
-	165.8	[MMC] Material Change Remarks: Vitrified clay
-	167.1	[TFC] Tap Factory Capped at 2 o'clock
3	168	[CM] Crack Multiple from 9 to 3 o'clock within 8" of joint
-	168	[MMC] Material Change Remarks: Concrete
-	180.3	[MMC] Material Change Remarks: Vitrified clay
-	181.6	[TF] Tap Factory at 10 o'clock
4	182.5	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint
-	182.5	[MMC] Material Change Remarks: Concrete
-	183.3	[TBA] Tap Break-in Active at 1 o'clock
-	185.7	[MMC] Material Change Remarks: Vitrified clay

-	185.7	[TFC] Tap Factory Capped at 2 o'clock
-	186.9	[MMC] Material Change Remarks: Concrete
-	200.3	[MGP] General Photo
-	229.7	[MMC] Material Change Remarks: Vitrified clay
-	229.7	[TFC] Tap Factory Capped at 10 o'clock
-	230.9	[MMC] Material Change Remarks: Concrete
-	250.4	[MGP] General Photo
-	250.4	[MMC] Material Change Remarks: Vitrified clay
-	252.7	[TF] Tap Factory at 2 o'clock
3	255	[CM] Crack Multiple from 11 to 1 o'clock within 8" of joint
-	255	[MMC] Material Change Remarks: Concrete
3	262.8	[TBI] Tap Break-in Intruding at 11 o'clock NOT within 8" of joint
-	279.5	[TB] Tap Break-in at 12 o'clock
3	281.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	281.4	[MMC] Material Change Remarks: Vitrified clay
-	281.7	[TF] Tap Factory at 10 o'clock
4	284	[FM] Fracture Multiple from 12 to 2 o'clock within 8" of joint
-	284.4	[MMC] Material Change Remarks: Concrete
-	300.4	[MGP] General Photo
3	301.7	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	301.7	[MMC] Material Change Remarks: Vitrified clay
-	307.9	[TF] Tap Factory at 2 o'clock
3	309	[FL] Fracture Longitudinal at 2 o'clock within 8" of joint
-	310.1	[MMC] Material Change Remarks: Concrete
3	334.7	[TBI] Tap Break-in Intruding at 2 o'clock NOT within 8" of joint Remarks: Tap is active
-	336.3	[MMC] Material Change Remarks: Vitrified clay
-	336.3	[TFC] Tap Factory Capped at 2 o'clock
-	337.6	[MMC] Material Change Remarks: Concrete
-	350.2	[MGP] General Photo
-	353.5	[MMC] Material Change Remarks: Vitrified clay
-	353.5	[TFC] Tap Factory Capped at 10 o'clock
-	355.9	[MMC] Material Change Remarks: Concrete
3	355.9	[TBI] Tap Break-in Intruding at 10 o'clock NOT within 8" of joint Remarks: Tap is active
-	363.3	[MMC] Material Change Remarks: Vitrified clay
-	364.8	[TFC] Tap Factory Capped at 10 o'clock
-	367.6	[MMC] Material Change Remarks: Concrete
-	367.6	[MMC] Material Change Remarks: Vitrified clay
-	379	[TF] Tap Factory at 10 o'clock
-	380.3	[MMC] Material Change Remarks: Concrete
-	381.5	[TB] Tap Break-in at 2 o'clock
-	391.3	[MMC] Material Change Remarks: Vitrified clay
-	393.2	[TFC] Tap Factory Capped at 2 o'clock
-	394.6	[MMC] Material Change Remarks: Concrete



Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	40% of cross sectional area				40	☐		
3	0	SAP	Surface Aggregate Projecting	from 7 to 5 o'clock NOT within 8" of joint Start	S01				☐	7	5
1	16.9	VC	Vermin Cockroach	NOT within 8" of joint					☐		
-	16.9	MWL	Water Level	50% of cross sectional area				50	☐		
-	50.5	MGP	General Photo						☐		
-	61.1	MMC	Material Change	Remarks: Vitrified clay					☐		
-	62.4	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
2	63.5	CL	Crack Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	63.7	MMC	Material Change	Remarks: Concrete					☐		
-	65.4	TB	Tap Break-in	at 11 o'clock		4			☐	11	
-	84.2	MMC	Material Change	Remarks: Vitrified clay					☐		
-	85.6	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	86.9	MMC	Material Change	Remarks: Concrete					☐		
3	92.4	FL	Fracture Longitudinal	at 10 o'clock within 8" of joint					☑	10	
-	100.1	MGP	General Photo						☐		
3	116.1	FL	Fracture Longitudinal	at 10 o'clock within 8" of joint					☑	10	
-	116.5	MMC	Material Change	Remarks: Vitrified clay					☐		
-	117.8	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
3	118.7	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
-	119	MMC	Material Change	Remarks: Concrete					☐		
-	119.5	TB	Tap Break-in	at 12 o'clock		4			☐	12	
-	125.2	TBA	Tap Break-in Active	at 10 o'clock		4			☐	10	
-	140	TB	Tap Break-in	at 1 o'clock		4			☐	1	
3	142.4	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	150.5	MGP	General Photo						☐		
-	160.4	MMC	Material Change	Remarks: Vitrified clay					☐		
-	161.7	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	163	MMC	Material Change	Remarks: Concrete					☐		
-	165.1	TB	Tap Break-in	at 12 o'clock		4			☐	12	
-	165.8	MMC	Material Change	Remarks: Vitrified clay					☐		
-	167.1	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
3	168	CM	Crack Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3

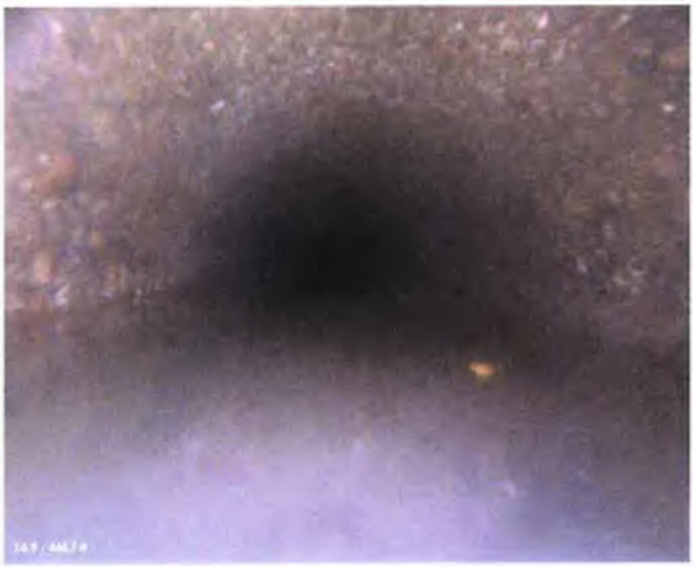
-	379	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	380.3	MMC	Material Change	Remarks: Concrete					☐		
-	381.5	TB	Tap Break-in	at 2 o'clock		4			☐	2	
-	391.3	MMC	Material Change	Remarks: Vitrified clay					☐		
-	393.2	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	394.6	MMC	Material Change	Remarks: Concrete					☐		
-	395.6	MMC	Material Change	Remarks: Concrete					☐		
-	395.6	MGP	General Photo						☐		
-	420.8	MWL	Water Level	5% of cross sectional area				5	☐		
-	420.8	MMC	Material Change	Remarks: Vitrified clay					☐		
-	428.2	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	429.3	MMC	Material Change	Remarks: Concrete					☐		
3	430.5	SAP	Surface Aggregate Projecting	from 7 to 5 o'clock NOT within 8" of joint End	F01				☐	7	5
-	446.7	MSA	Abandoned Survey	Remarks: Unknown					☐		

PACP Code:	AMH		
Description:	Manhole		
Image Name:	2b860ff7-fbf1-4a0a-9d22-5e8c24ba4cdd_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

PACP Code:	MWL		
Description:	Water Level		
Image Name:	413789bb-1100-494a-8f64-4fcf7994d1ce_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	40		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	SAP		
Description:	Surface Aggregate Projecting		
Image Name:	61aacbba-0c75-4b99-bff7-b28889e8adba_0-SAP.jpg		
Distance (ft):	0		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	7	Clock To:	5
1st Value:		2nd Value:	
Continuous Index:	S01	Within 8" of Joint:	☐
Remarks:			

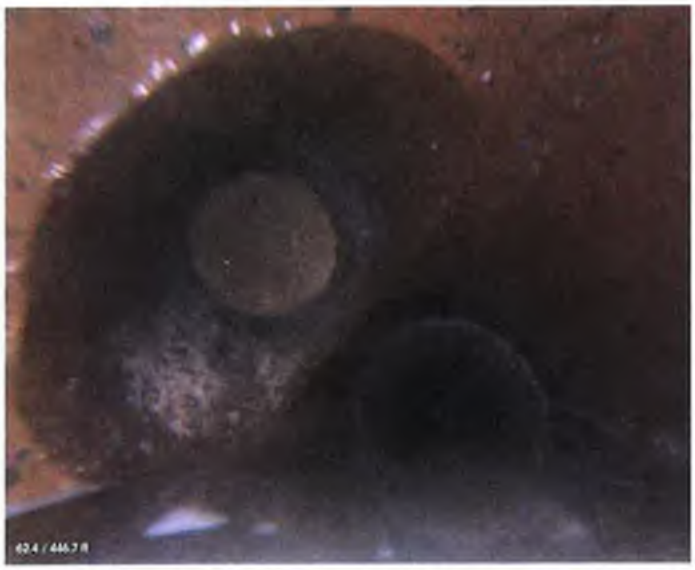
PACP Code:	VC		
Description:	Vermin Cockroach		
Image Name:	850bdc0a-5cc4-4148-afd0-c13fbfc361e3_16.9-VC.jpg		
Distance (ft):	16.9		
Structural Grade:	0	Maintenance Grade	1
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



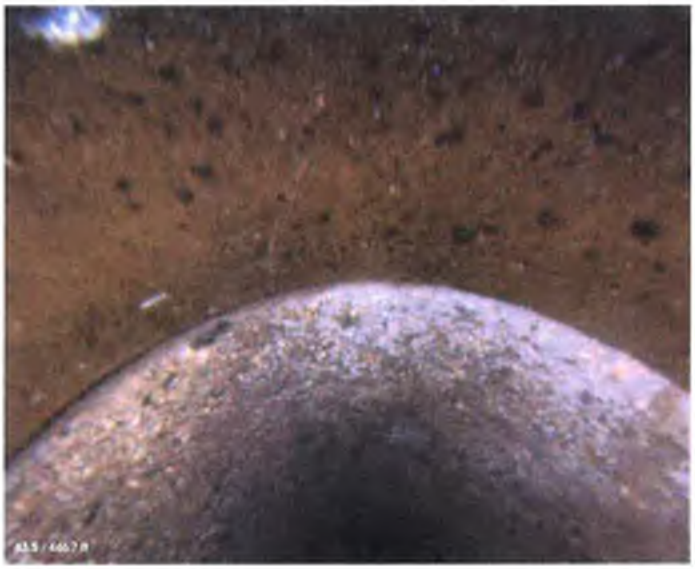
PACP Code:	MWL		
Description:	Water Level		
Image Name:	d7208376-bc92-42f3-bf04-c0403826ee01_16.9-MWL.jpg		
Distance (ft):	16.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	50		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**014d1adf-cb60-4b48-8776-89d40a5fa631_50.5-MGP.jpg**		
Distance (ft):	**50.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**e32e1023-96c9-4783-a4ff-128839fb1750_61.1-MMC.jpg**		
Distance (ft):	**61.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

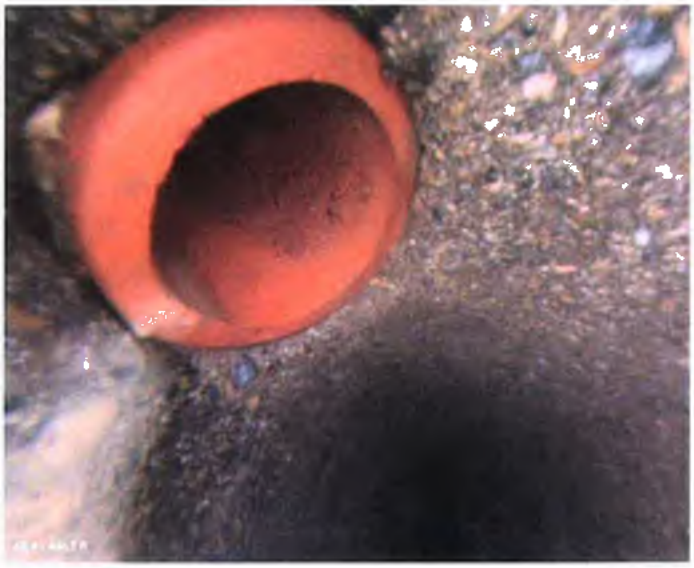


PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**e3356d51-7f6e-4ab9-bb27-82f973db3bac_62.4-TFC.jpg**		
Distance (ft):	**62.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



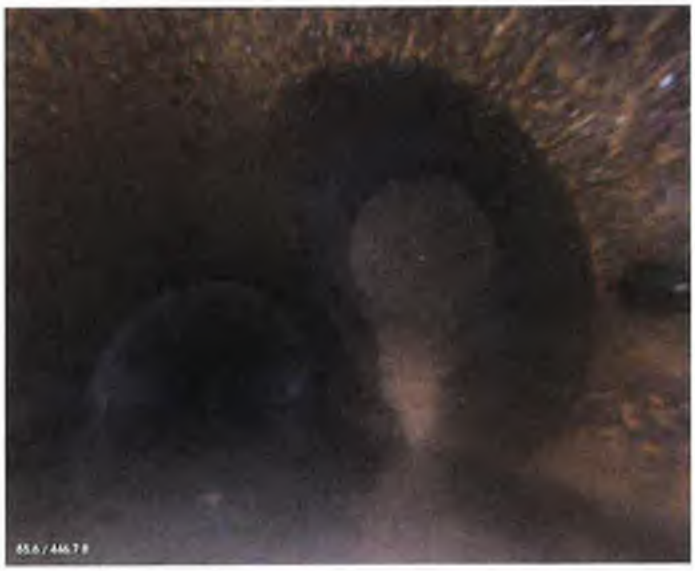
PACP Code:	CL		
Description:	Crack Longitudinal		
Image Name:	5f74c636-04da-4159-ad50-07ed11056066_63.5-CL.jpg		
Distance (ft):	63.5		
Structural Grade:	2	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	4d80caa3-c324-447b-b91e-68b2c981309d_63.7-MMC.jpg		
Distance (ft):	63.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		

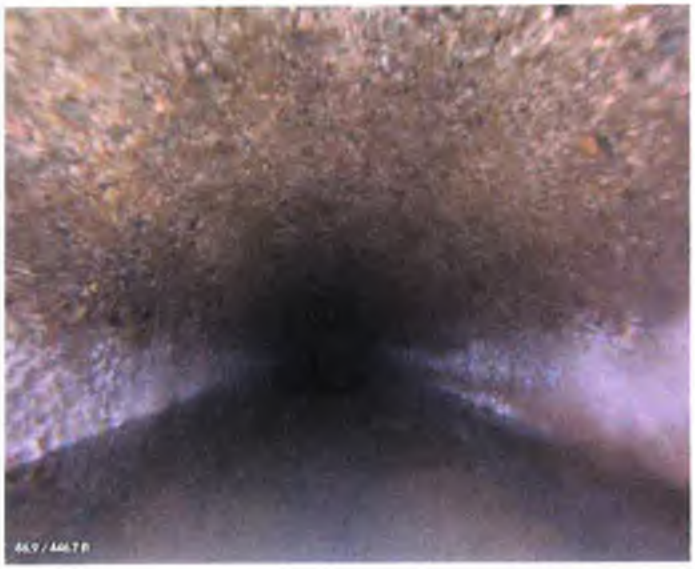


PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	27018ac5-6735-478c-bffd-05803fcb2e1a_65.4-TB.jpg		
Distance (ft):	65.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

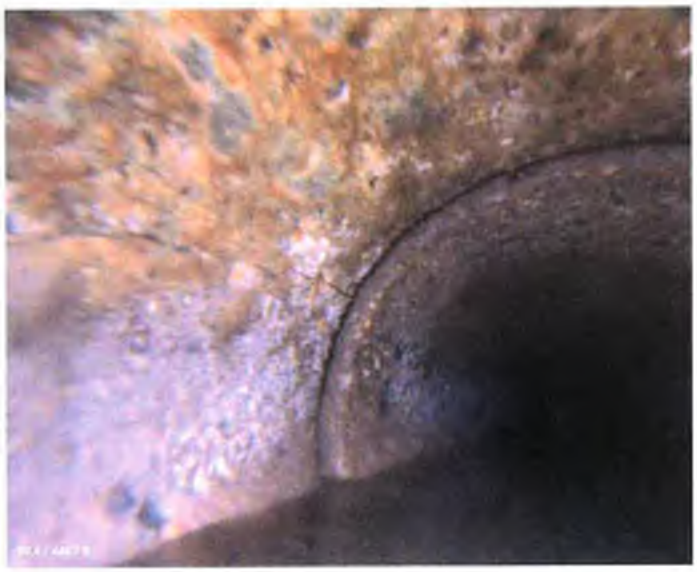
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**0e561e37-41b2-48f8-b2e9-caacaeb79129_84.2-MMC.jpg**		
Distance (ft):	**84.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**be52c37c-4efe-4c1f-a3e3-33ffc8493e25_85.6-TFC.jpg**		
Distance (ft):	**85.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

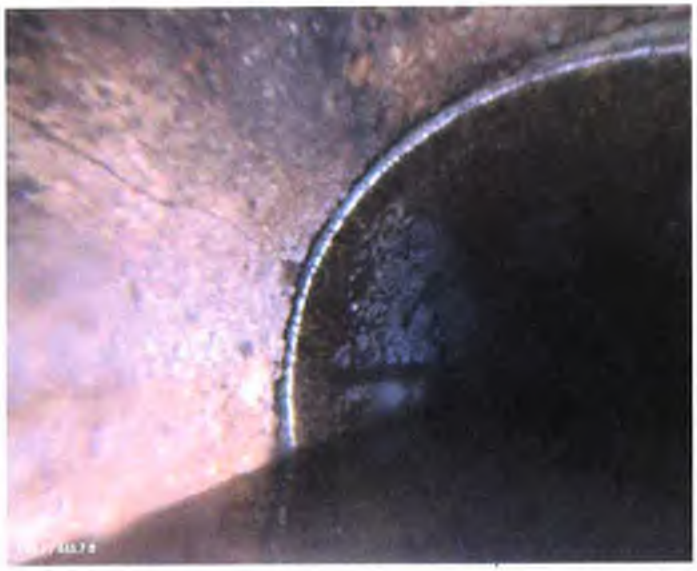


PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**cff6fb92-3150-4f7c-9e30-c7c6a4b6fe54_86.9-MMC.jpg**		
Distance (ft):	**86.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

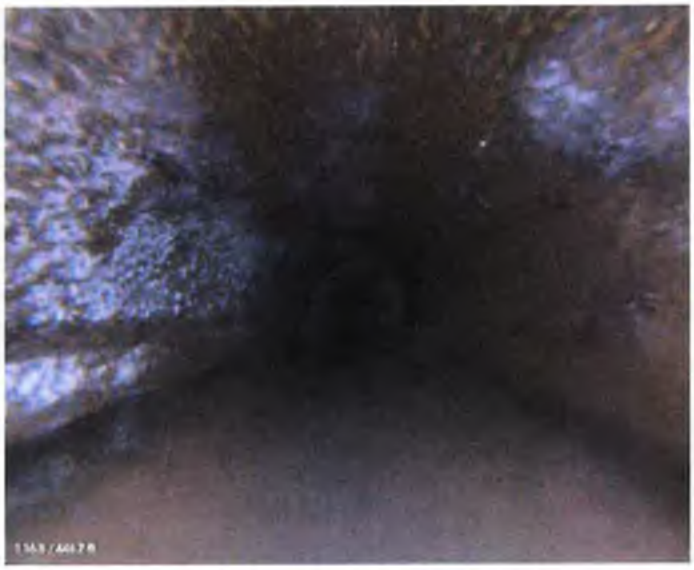


PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**5fb49ba9-e6b2-4d7a-b312-6b3a1e1ec810_92.4-FL.jpg**		
Distance (ft):	**92.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

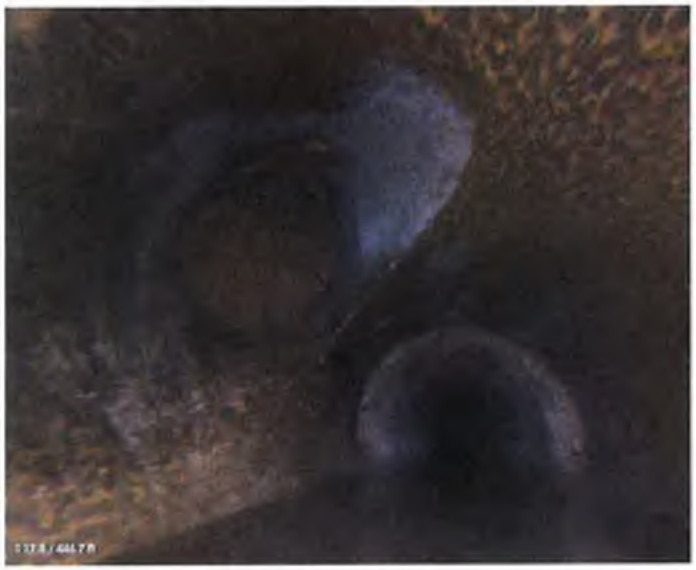
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**c8e35751-9013-4d7f-bc18-3199af99a542_100.1-MGP.jpg**		
Distance (ft):	**100.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**1aed6c7d-d247-46a9-983b-6a095ab9ca15_116.1-FL.jpg**		
Distance (ft):	**116.1**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



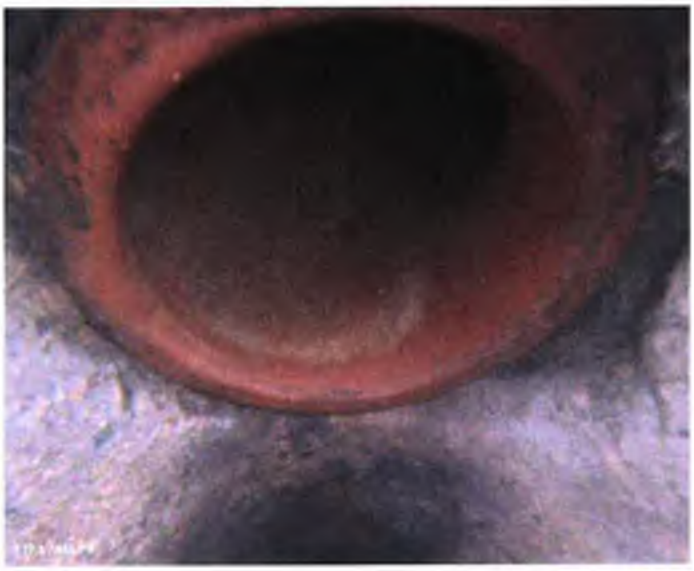
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**49e08066-ea03-44e6-9b0c-df903ab1ce54_116.5-MMC.jpg**		
Distance (ft):	**116.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



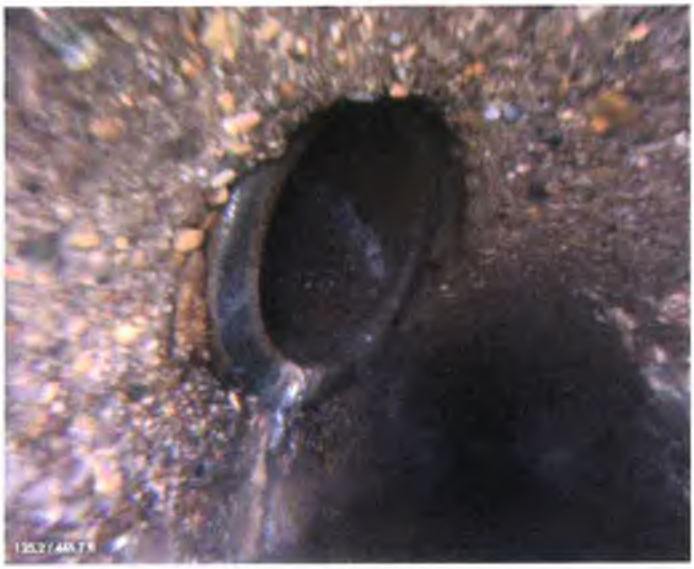
PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**1aff4996-0d0b-4426-be81-a006174460d9_117.8-TFC.jpg**		
Distance (ft):	**117.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**393745a7-06f5-4033-98f7-1760ded1ca72_118.7-FL.jpg**		
Distance (ft):	**118.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	12c1ceaa-1776-4ac7-8ef5-72ef0f64e556_119-MMC.jpg		
Distance (ft):	119		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		



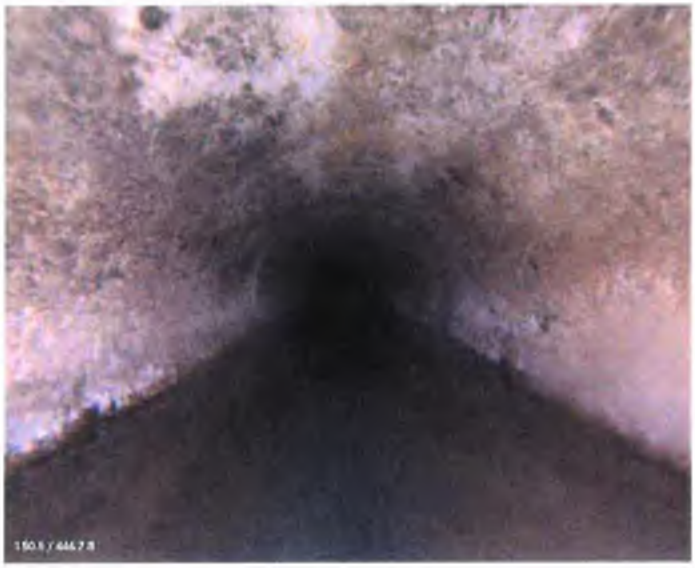
PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	18e65940-a114-498b-a3a6-dd12f8d4015a_119.5-TB.jpg		
Distance (ft):	119.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



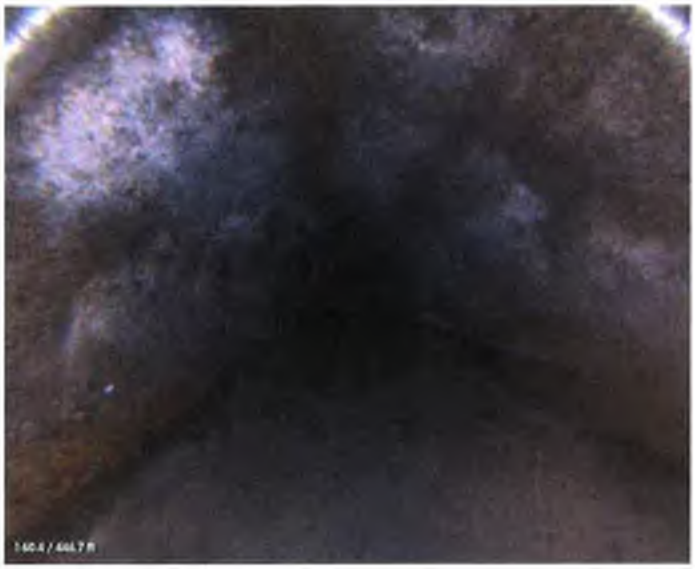
PACP Code:	TBA		
Description:	Tap Break-in Active		
Image Name:	b4a6358b-3e43-4671-a15a-09493979eba4_125.2-TBA.jpg		
Distance (ft):	125.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	41b1d0b0-99b3-4337-9614-c4d3d1d5378a_140-TB.jpg		
Distance (ft):	140		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

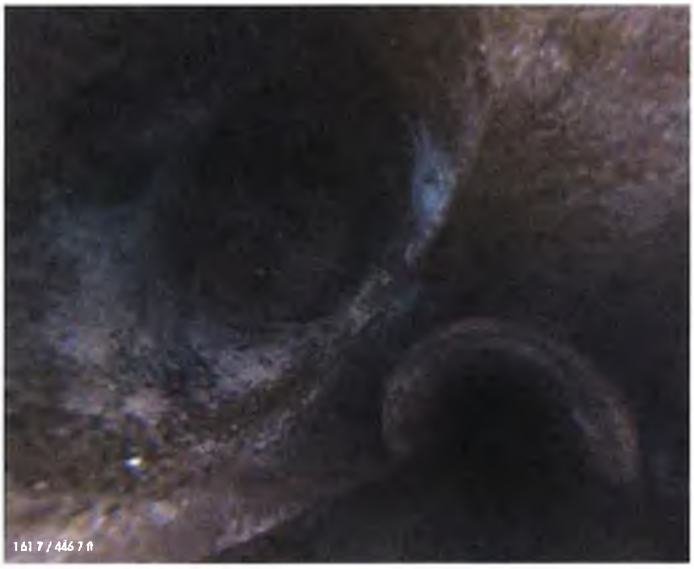
PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	bd781bbc-e406-4ef3-b1e8-24770447ba82_142.4-FL.jpg		
Distance (ft):	142.4		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



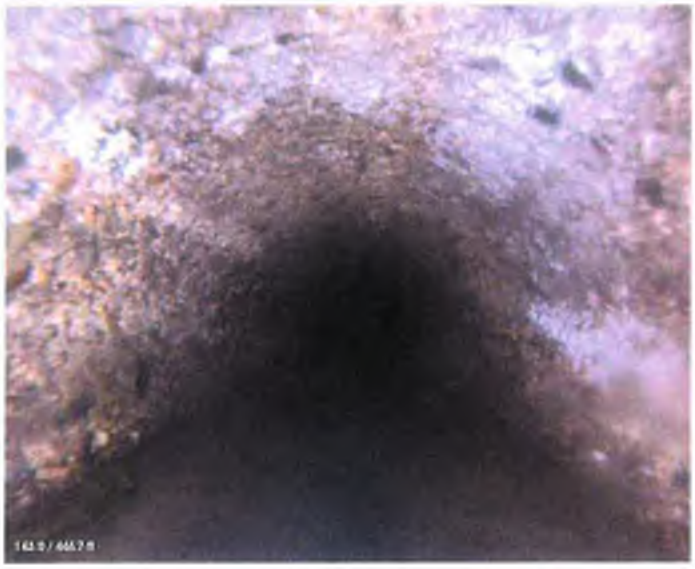
PACP Code:	MGP		
Description:	General Photo		
Image Name:	4b3fd330-bef2-409e-a6b9-9370d9af6c85_150.5-MGP.jpg		
Distance (ft):	150.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



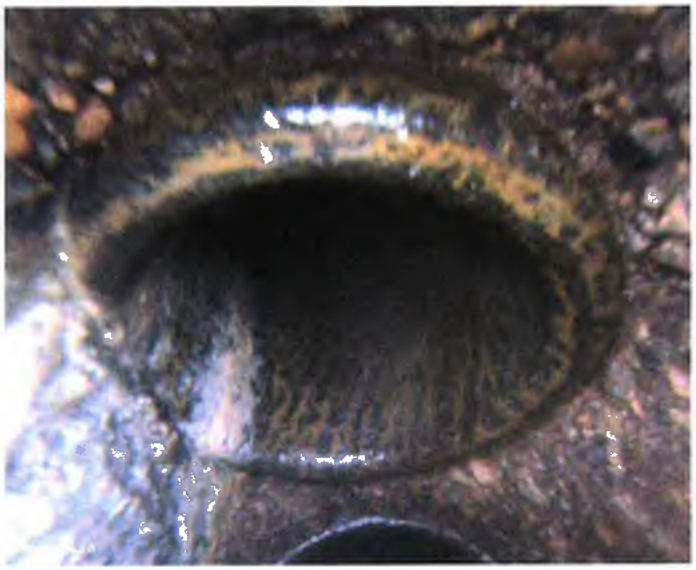
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**346b903e-4b20-4686-8f56-0b675fd78088_160.4-MMC.jpg**		
Distance (ft):	**160.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**0abadc35-098a-4912-8f00-c3772ddcd396_161.7-TFC.jpg**		
Distance (ft):	**161.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



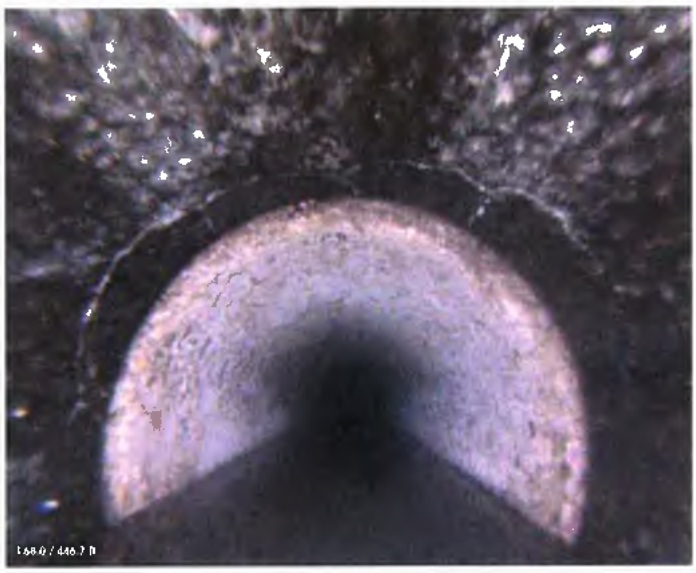
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**748d433e-96b0-46f1-b2f3-1bac977bd4fb_163-MMC.jpg**		
Distance (ft):	**163**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		



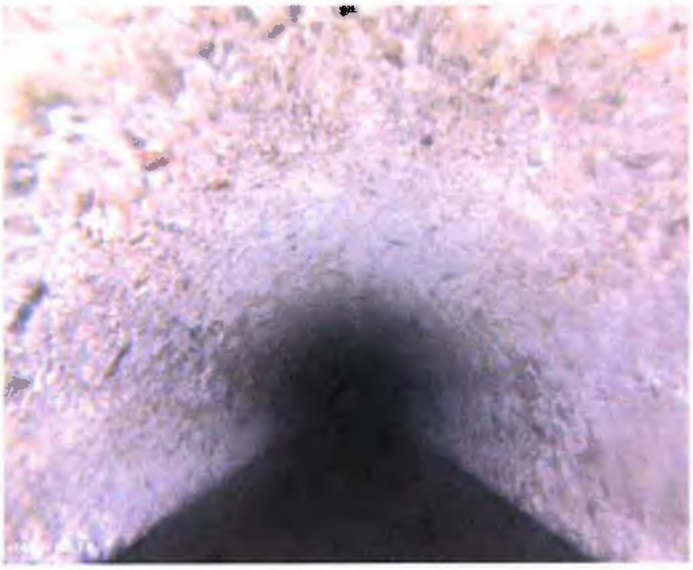
PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	ecc26f61-bbe5-412f-a103-847cc3e271d4_165.1-TB.jpg		
Distance (ft):	165.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	001bec05-2e0c-4744-bfea-53e9d0aabebe_165.8-MMC.jpg		
Distance (ft):	165.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Vitrified clay		

PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	9a54597e-4b41-4044-a785-b425231b63cc_167.1-TFC.jpg		
Distance (ft):	167.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



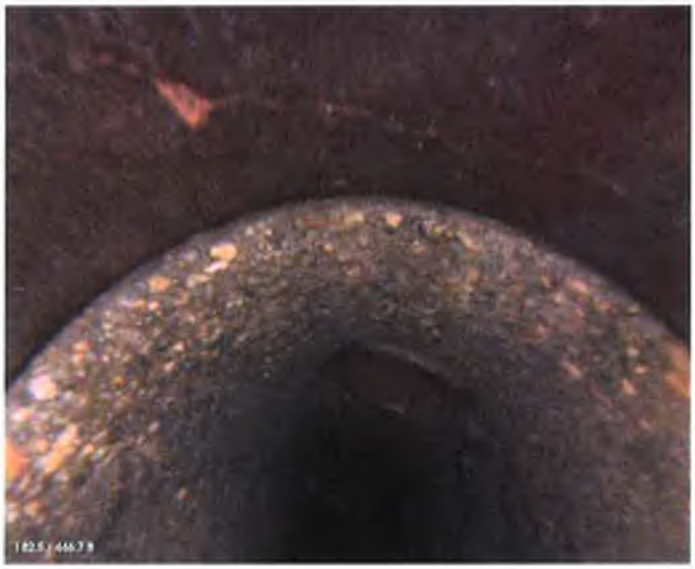
PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**3e7d4d78-aea4-4094-9f3f-1741aee21751_168-CM.jpg**		
Distance (ft):	**168**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**ccd07a8e-3ba0-4129-8820-bfae3ea26168_168-MMC.jpg**		
Distance (ft):	**168**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

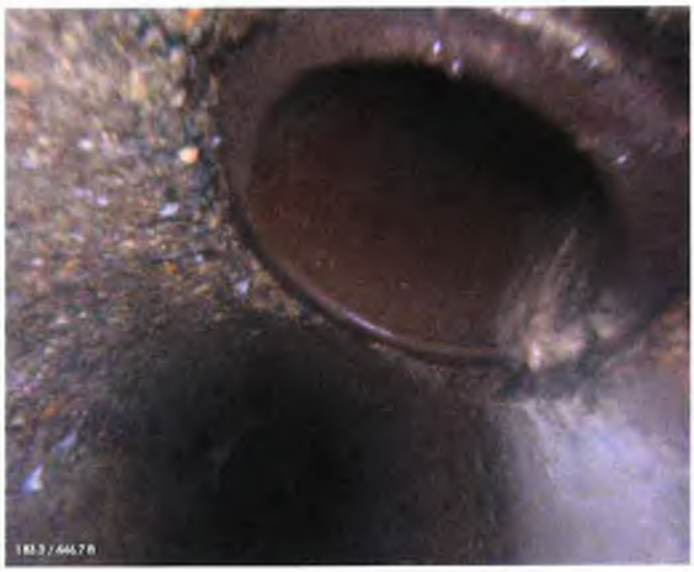
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**fbecbe6b-a18a-4ce0-b613-d51ee0e52d8b_180.3-MMC.jpg**		
Distance (ft):	**180.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**58a1df89-bef1-4f81-b6ba-5b2a5b6a598d_181.6-TF.jpg**		
Distance (ft):	**181.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



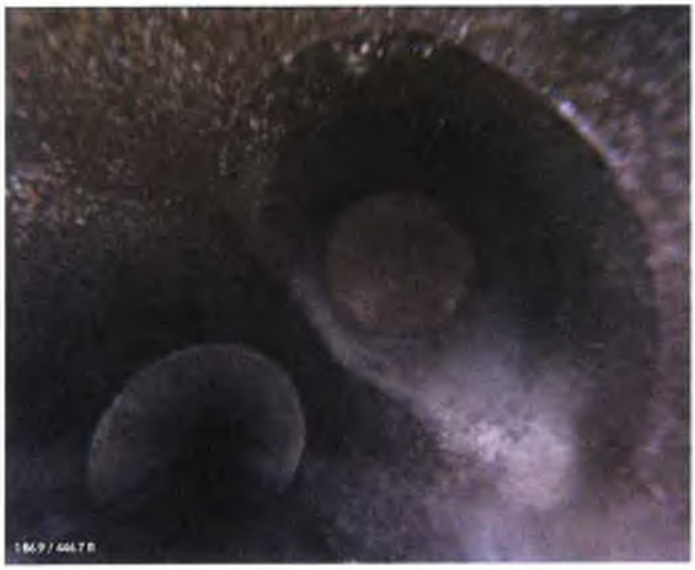
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**c32d0b21-ca58-48d6-94fe-0f49ca28bd8b_182.5-FM.jpg**		
Distance (ft):	**182.5**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**a09d291f-6673-4539-ae6b-1702797d2f9b_182.5-MMC.jpg**		
Distance (ft):	**182.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

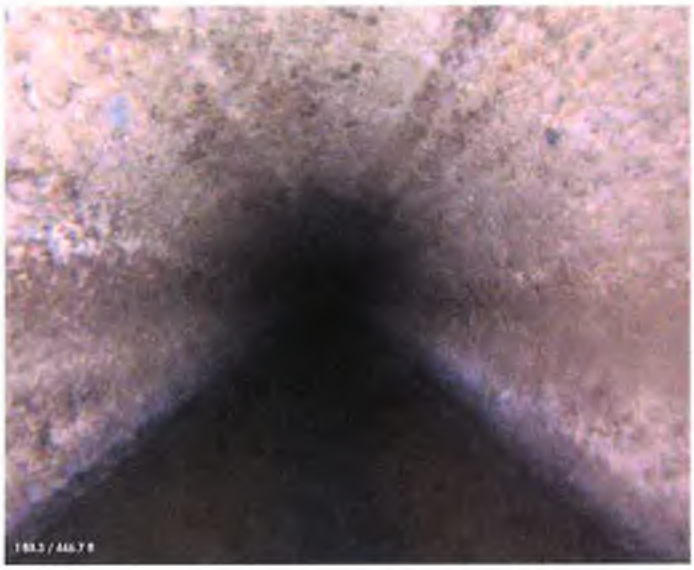


PACP Code:	TBA		
Description:	Tap Break-in Active		
Image Name:	d4ee8b3b-4c96-49fe-9e50-ec72874a8660_183.3-TBA.jpg		
Distance (ft):	183.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	b1460cb4-f191-47c9-a7f9-4aa1236fa270_185.7-MMC.jpg		
Distance (ft):	185.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Vitrified clay		



PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	627f1f7c-abfe-4609-8c4b-2faf2fa52477_185.7-TFC.jpg		
Distance (ft):	185.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

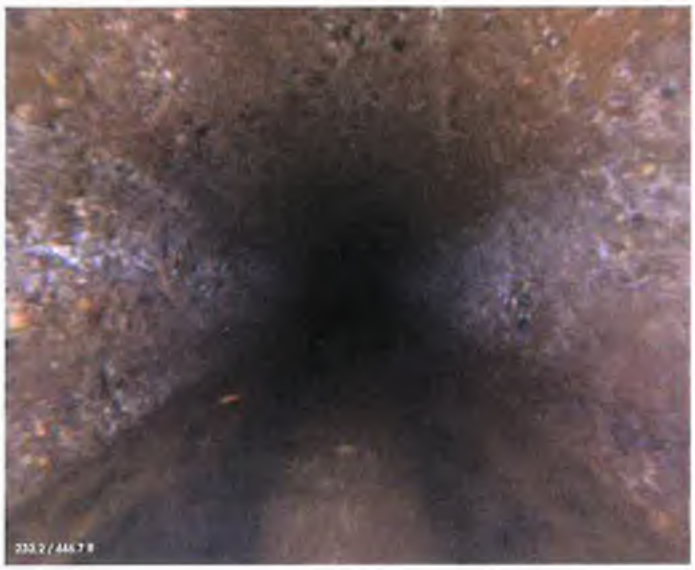


PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**c7c4ff10-ae71-4984-9f81-c1a6fdb5683a_186.9-MMC.jpg**		
Distance (ft):	**186.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**2c2dbdb5-ca9c-408e-aac0-2514e90dba38_200.3-MGP.jpg**		
Distance (ft):	**200.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**5fe863fe-3031-4c6d-a0ad-5fb931c0f009_229.7-MMC.jpg**		
Distance (ft):	**229.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**c3a24ffb-1321-47c3-ac7d-b4d179ceba3d_229.7-TFC.jpg**		
Distance (ft):	**229.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

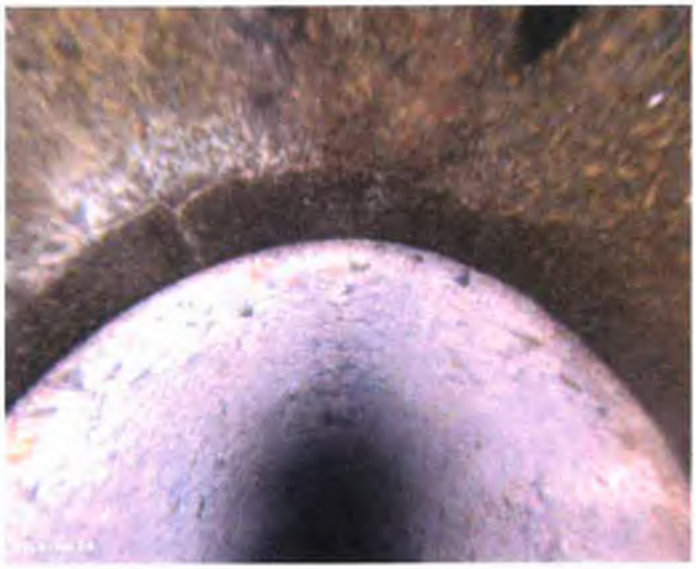


PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**de18f41b-1bee-4e34-bed4-1b3ef0266d71_230.9-MMC.jpg**		
Distance (ft):	**230.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

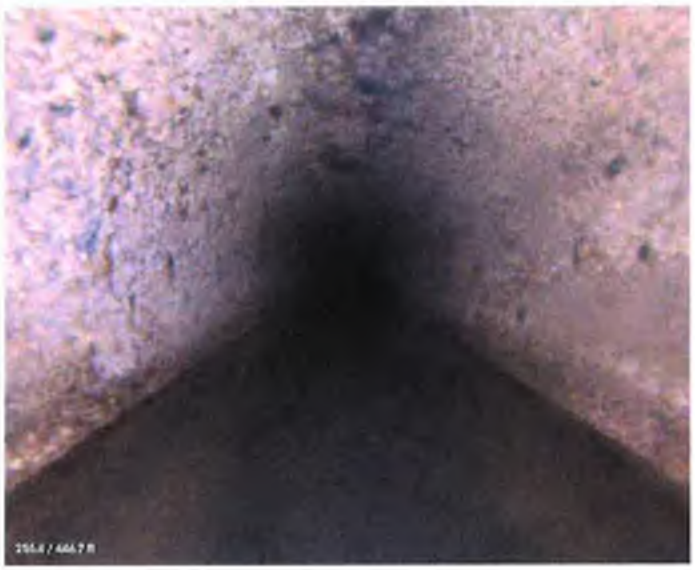
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**5081586e-706e-4ea8-8a08-7b3c3224b355_250.4-MGP.jpg**		
Distance (ft):	**250.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**2a61f5a6-d8b0-4676-b639-3c575e7366b6_250.4-MMC.jpg**		
Distance (ft):	**250.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**0b8e05f5-cca9-494d-8bb9-f091b1aa6961_252.7-TF.jpg**		
Distance (ft):	**252.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



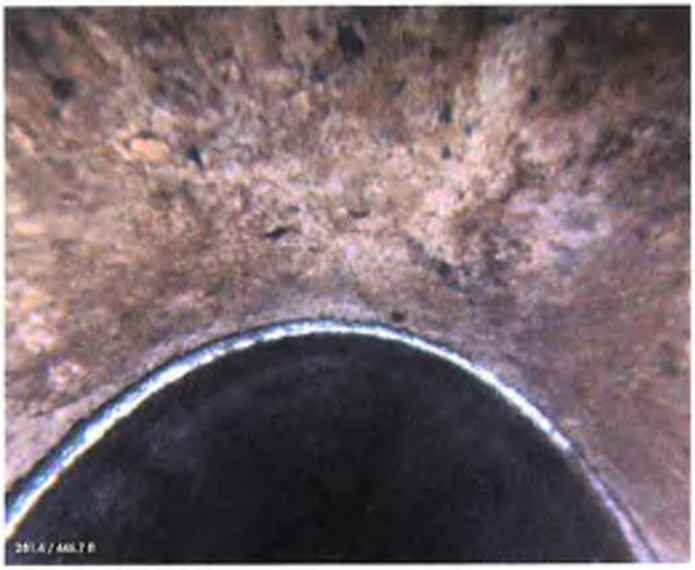
PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**cbed443d-8d0c-4394-8060-92a5065f99a6_255-CM.jpg**		
Distance (ft):	**255**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**6af13e54-9365-4e69-babf-704f9eee73dd_255-MMC.jpg**		
Distance (ft):	**255**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

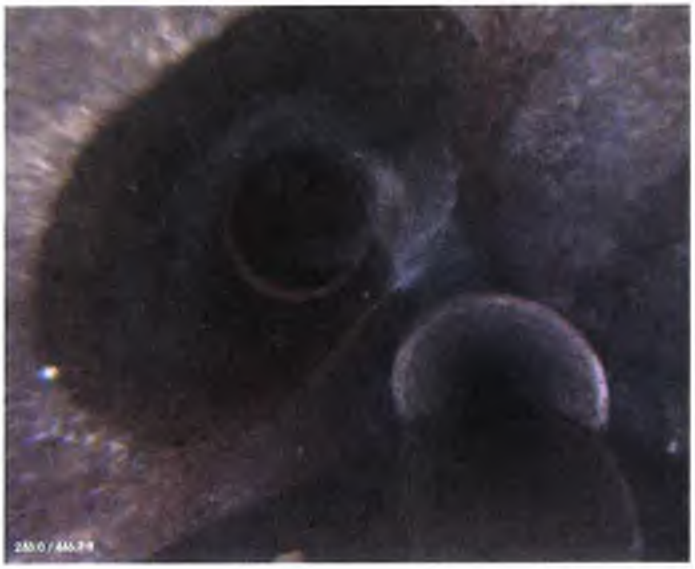
PACP Code:	**TBI**		
Description:	**Tap Break-in Intruding**		
Image Name:	**b7204fdf-2711-4f19-9563-401e86e73715_262.8-TBI.jpg**		
Distance (ft):	**262.8**		
Structural Grade:	**0**	Maintenance Grade	**3**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:	**4**	2nd Value:	**2**
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**TB**		
Description:	**Tap Break-in**		
Image Name:	**61446f17-db50-44e1-b88e-d12f251ba54d_279.5-TB.jpg**		
Distance (ft):	**279.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**724c389a-7ff0-4eb6-8884-2b74de249b4d_281.4-FL.jpg**		
Distance (ft):	**281.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**d1ef6d5e-1701-4bac-acd9-97b013f39f40_281.4-MMC.jpg**		
Distance (ft):	**281.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

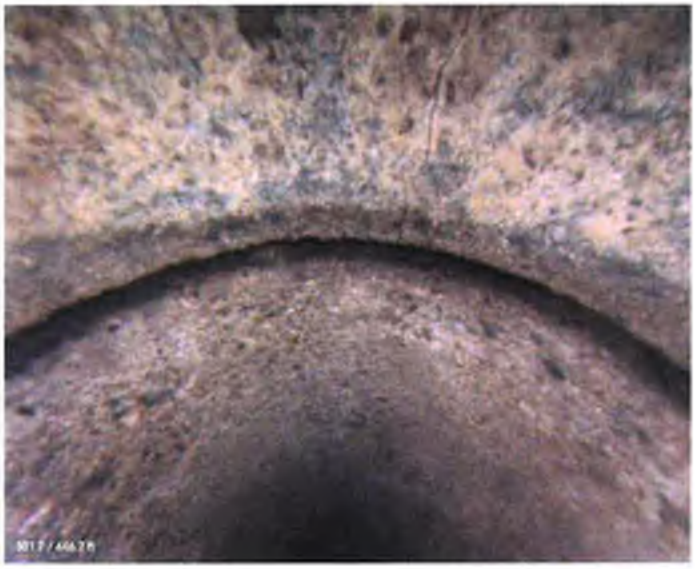


PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**22e36c60-91c2-4c77-8b02-34b61aea873d_281.7-TF.jpg**		
Distance (ft):	**281.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
`1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

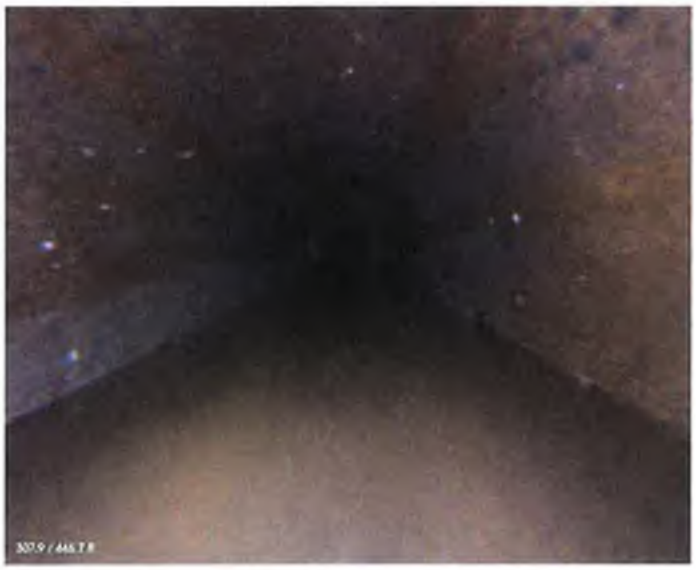
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**88ea4530-a8e3-4ec7-a2c0-97512b12198e_284-FM.jpg**		
Distance (ft):	**284**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**9f65ee58-9455-40a1-bae7-1e04ff0f34ac_284.4-MMC.jpg**		
Distance (ft):	**284.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**7cafa14c-642d-4ad2-b7b5-f0c39c857b1b_300.4-MGP.jpg**		
Distance (ft):	**300.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**3c278199-fb93-4b4d-92e1-0d79cbfcdab3_301.7-FL.jpg**		
Distance (ft):	**301.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



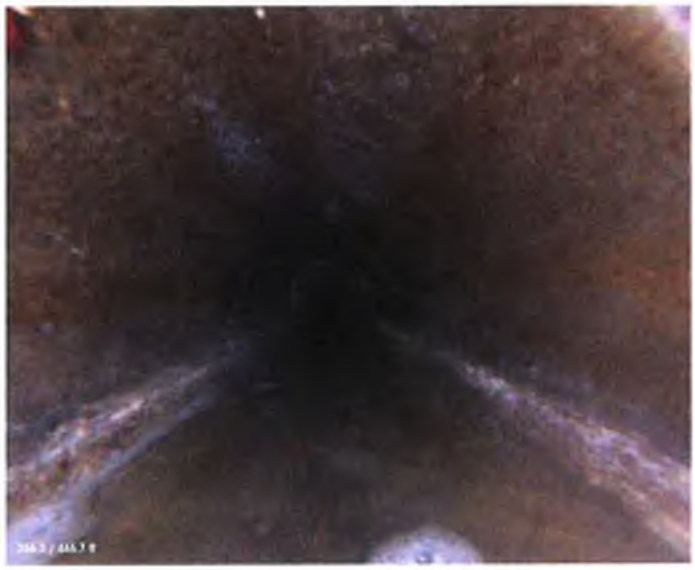
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**cecc6109-3670-4ac9-9e77-81599184c6cf_301.7-MMC.jpg**		
Distance (ft):	**301.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**61679f8f-01d1-4873-bbb5-2d60fadb68fd_307.9-TF.jpg**		
Distance (ft):	**307.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	476e11ab-3228-4a5a-8b9a-70d26eb80ef2_309-FL.jpg		
Distance (ft):	309		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	85388f8c-64eb-4b1d-9696-04d77755f0dd_310.1-MMC.jpg		
Distance (ft):	310.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		

PACP Code:	TBI		
Description:	Tap Break-in Intruding		
Image Name:	9b5da842-a2f8-4475-86aa-7343e06fbcdb_334.7-TBI.jpg		
Distance (ft):	334.7		
Structural Grade:	0	Maintenance Grade	3
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	2
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Tap is active		



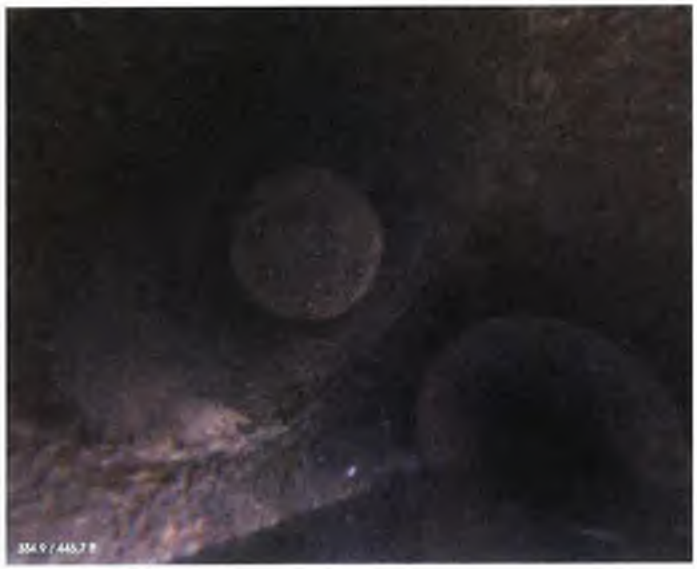
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**b5dd2c27-4fcc-4d6a-9c28-22836fa6d736_336.3-MMC.jpg**		
Distance (ft):	**336.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**d0e12a3d-0fe8-4f8f-ad2a-0e73c1859e88_336.3-TFC.jpg**		
Distance (ft):	**336.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**c882ca55-c29d-4086-9008-767f4bb990b9_337.6-MMC.jpg**		
Distance (ft):	**337.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

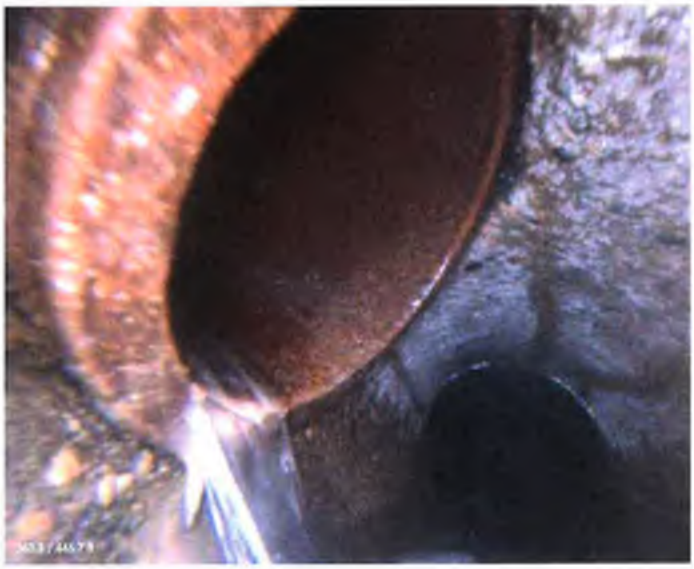
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**4e06f6eb-3f44-41de-b289-30ef3d638ac1_350.2-MGP.jpg**		
Distance (ft):	**350.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**c57525e9-db05-4bc9-98f1-735c207b8776_353.5-MMC.jpg**		
Distance (ft):	**353.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



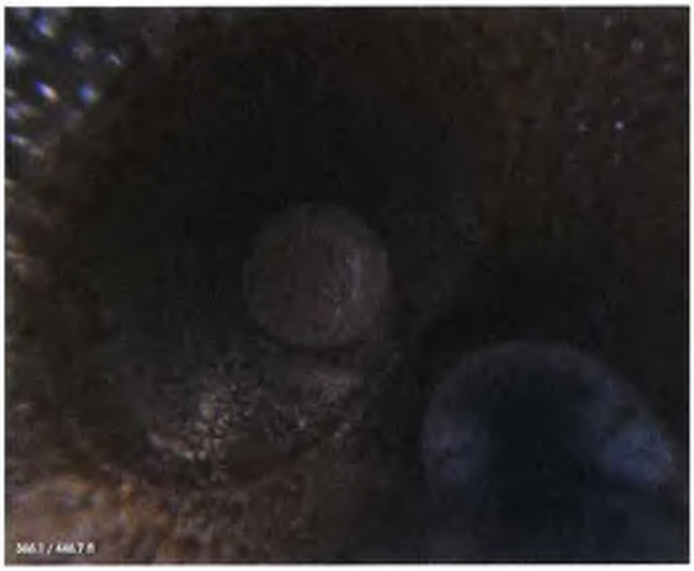
PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**b3b2b07d-73c2-4e20-9af2-0c35fee5b8ee_353.5-TFC.jpg**		
Distance (ft):	**353.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	20cc484a-d157-4bd3-a928-8b6ef5c4c6af_355.9-MMC.jpg		
Distance (ft):	355.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		



PACP Code:	TBI		
Description:	Tap Break-in Intruding		
Image Name:	8170fd8f-70da-4bd0-9ac2-8153342fb0f2_355.9-TBI.jpg		
Distance (ft):	355.9		
Structural Grade:	0	Maintenance Grade	3
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	2
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Tap is active		

PACP Code:	MMC		
Description:	Material Change		
Image Name:	55ab4430-fa4c-4699-a030-654cbf620b92_363.3-MMC.jpg		
Distance (ft):	363.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Vitrified clay		



PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	7f2ad9ec-df96-4d57-8660-4d5be3dfa104_364.8-TFC.jpg		
Distance (ft):	364.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

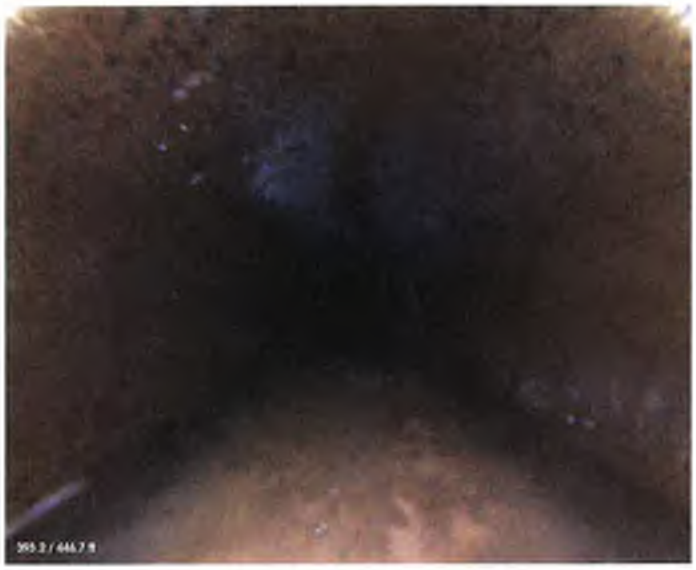
PACP Code:	MMC		
Description:	Material Change		
Image Name:	308a762e-d259-4e51-95c5-2b0eebe0b1fa_367.6-MMC.jpg		
Distance (ft):	367.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		

PACP Code:	MMC		
Description:	Material Change		
Image Name:	5b52540f-cfd1-4ca0-8ce9-9d0537f628d0_367.6-MMC.jpg		
Distance (ft):	367.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Vitrified clay		

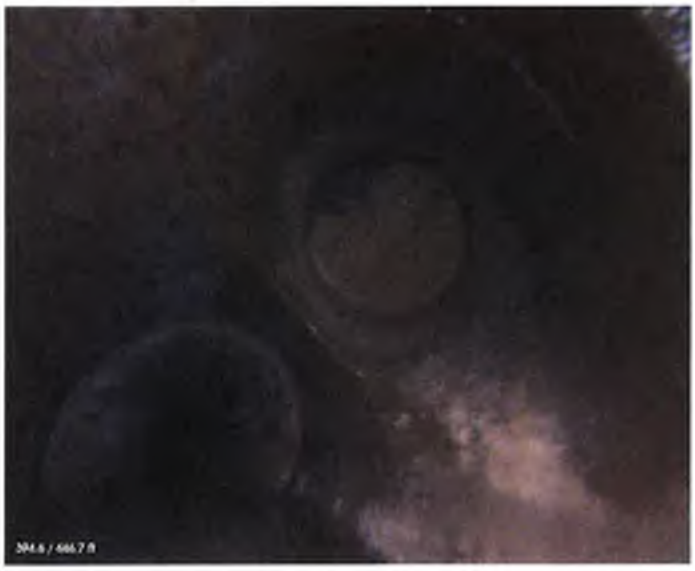
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	467ed414-0c60-4bcd-b85a-78c7abc418f7_379-TF.jpg		
Distance (ft):	379		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	eb1c34a9-d9ec-4fbc-87bc-4c3df4d0b882_380.3-MMC.jpg		
Distance (ft):	380.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	8e3ea69c-1e65-400e-a0a2-627821480d3a_381.5-TB.jpg		
Distance (ft):	381.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

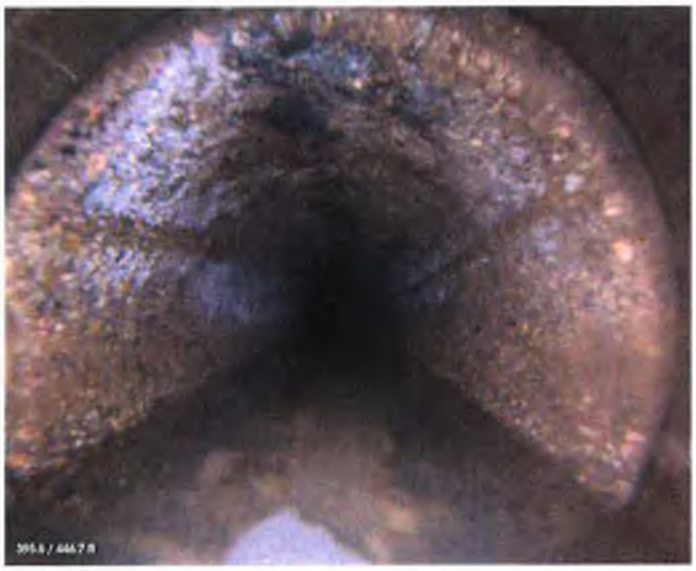


PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**1e6f85f6-39a8-4473-affa-3569f8d3a833_391.3-MMC.jpg**		
Distance (ft):	**391.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



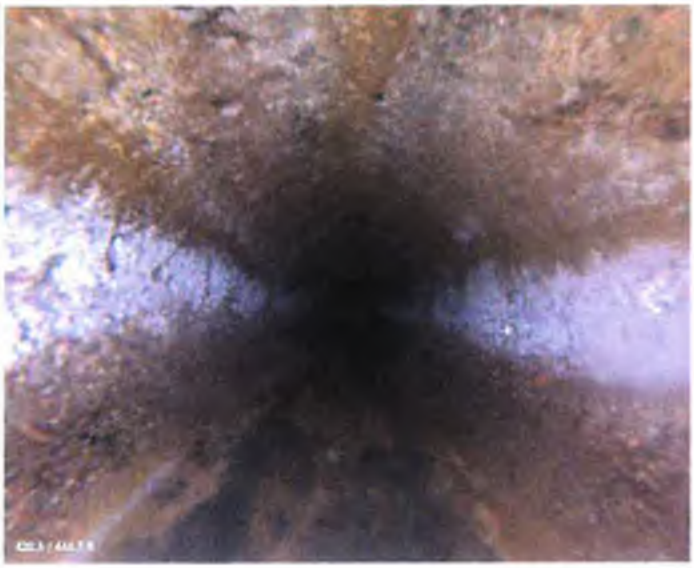
PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**fa2d7575-3f17-4361-9173-e3492817e0ef_393.2-TFC.jpg**		
Distance (ft):	**393.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**4d2fe266-db2d-43ab-b678-f32217e17d09_394.6-MMC.jpg**		
Distance (ft):	**394.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

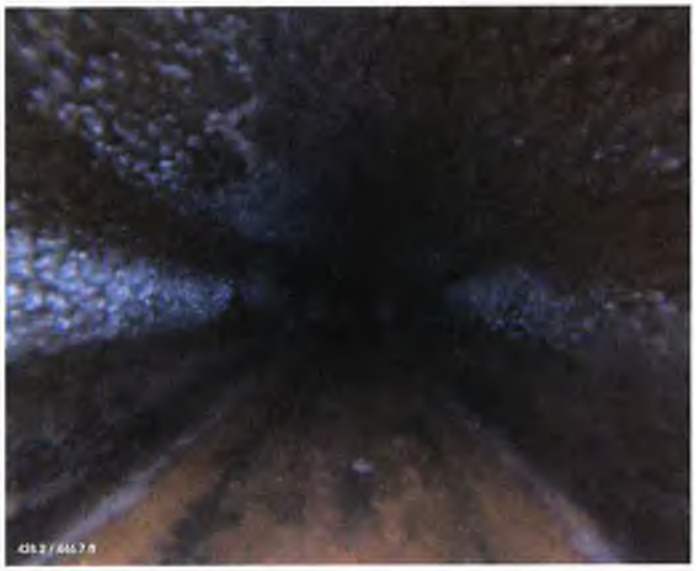


PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**2d99ae1c-07c6-481c-ba2b-6f65b93b84da_395.6-MMC.jpg**		
Distance (ft):	**395.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

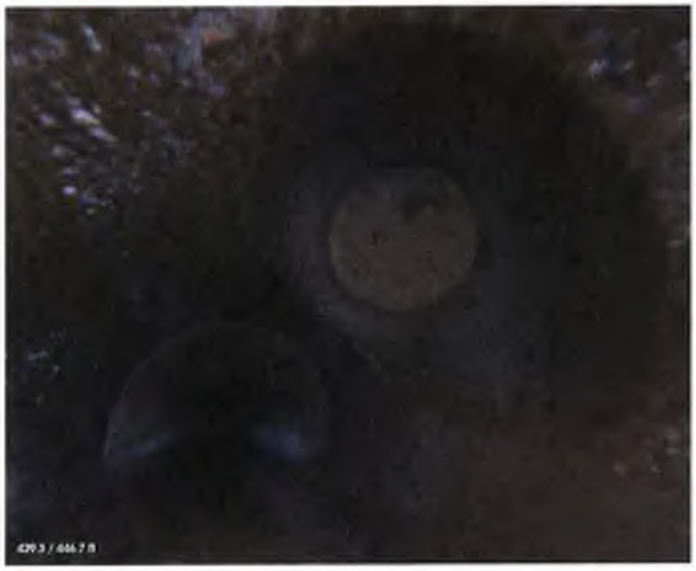
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**be3a6ccf-b608-451e-b18a-67c19e377769_395.6-MGP.jpg**		
Distance (ft):	**395.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**020f0417-5df5-4a8a-93cd-bb3b0878b594_420.8-MWL.jpg**		
Distance (ft):	**420.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**5**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**37d56725-1927-408c-8e7c-3838fb0848d8_420.8-MMC.jpg**		
Distance (ft):	**420.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**4c9a5889-1b0a-4a19-b570-371ef6c291f4_428.2-TFC.jpg**		
Distance (ft):	**428.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**223f227b-732f-45ba-8aa8-03efb13b09c3_429.3-MMC.jpg**		
Distance (ft):	**429.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**79b5b4d1-ffac-4bd2-a85a-d1f6f91c8b38_430.5-SAP.jpg**		
Distance (ft):	**430.5**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**7**	Clock To:	**5**
1st Value:		2nd Value:	
Continuous Index:	**F01**	Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MSA**		
Description:	**Abandoned Survey**		
Image Name:	**a0bf86d5-a775-4d28-9715-0a243baa9941_446.7-MSA.jpg**		
Distance (ft):	**446.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Unknown**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-2003 to 07-2001	07-2003	07-2001	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		327	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North Hill St	City of Arvin	Light Highway	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	01:45 PM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		327
Media Label	Reverse Setup	Work Order No	Additional Info	
NS23-1461	NO	-		

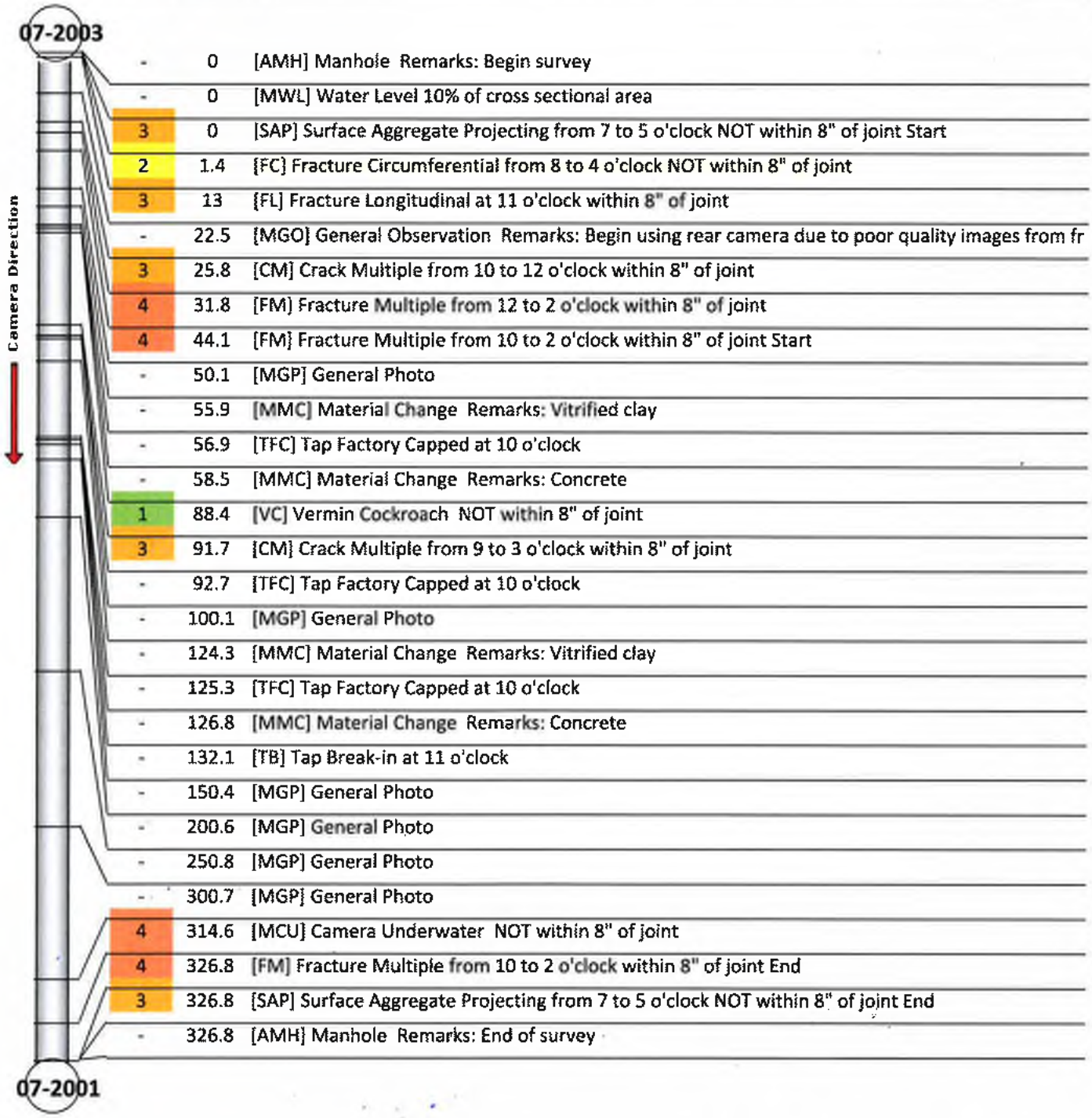
Results:

Overall Rating	Structural Rating	Maintenance Rating
443	438	5
Overall Index	Structural Index	Maintenance Index
3.43	3.45	2.5
Overall Quick	Structural Quick	Maintenance Quick
4J3L	4J3L	4111

Recommendation

- Due to no video, Open Trench Pipe Replacement

332

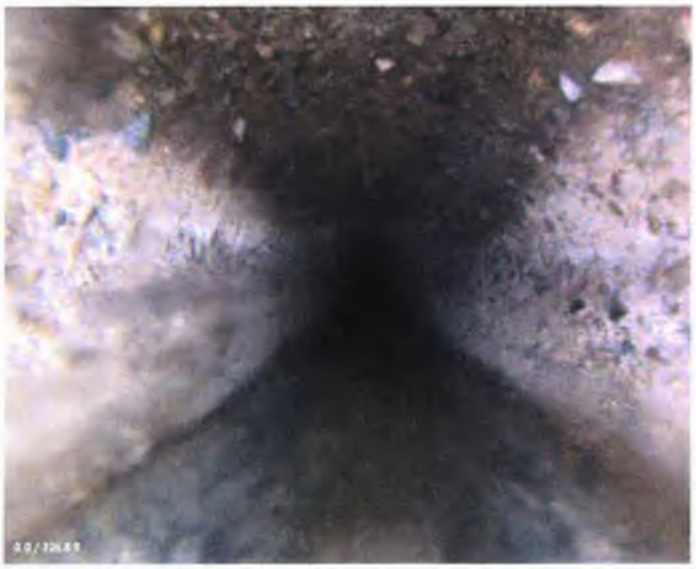


Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 10% of cross sectional area
3	0	[SAP] Surface Aggregate Projecting from 7 to 5 o'clock NOT within 8" of joint Start
2	1.4	[FC] Fracture Circumferential from 8 to 4 o'clock NOT within 8" of joint
3	13	[FL] Fracture Longitudinal at 11 o'clock within 8" of joint
-	22.5	[MGO] General Observation Remarks: Begin using rear camera due to poor quality images from fr
3	25.8	[CM] Crack Multiple from 10 to 12 o'clock within 8" of joint
4	31.8	[FM] Fracture Multiple from 12 to 2 o'clock within 8" of joint
4	44.1	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint Start
-	50.1	[MGP] General Photo
-	55.9	[MMC] Material Change Remarks: Vitrified clay
-	56.9	[TFC] Tap Factory Capped at 10 o'clock
-	58.5	[MMC] Material Change Remarks: Concrete
1	88.4	[VC] Vermin Cockroach NOT within 8" of joint
3	91.7	[CM] Crack Multiple from 9 to 3 o'clock within 8" of joint
-	92.7	[TFC] Tap Factory Capped at 10 o'clock
-	100.1	[MGP] General Photo
-	124.3	[MMC] Material Change Remarks: Vitrified clay
-	125.3	[TFC] Tap Factory Capped at 10 o'clock
-	126.8	[MMC] Material Change Remarks: Concrete
-	132.1	[TB] Tap Break-in at 11 o'clock
-	150.4	[MGP] General Photo
-	200.6	[MGP] General Photo
-	250.8	[MGP] General Photo
-	300.7	[MGP] General Photo
4	314.6	[MCU] Camera Underwater NOT within 8" of joint
4	326.8	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint End
3	326.8	[SAP] Surface Aggregate Projecting from 7 to 5 o'clock NOT within 8" of joint End
-	326.8	[AMH] Manhole Remarks: End of survey

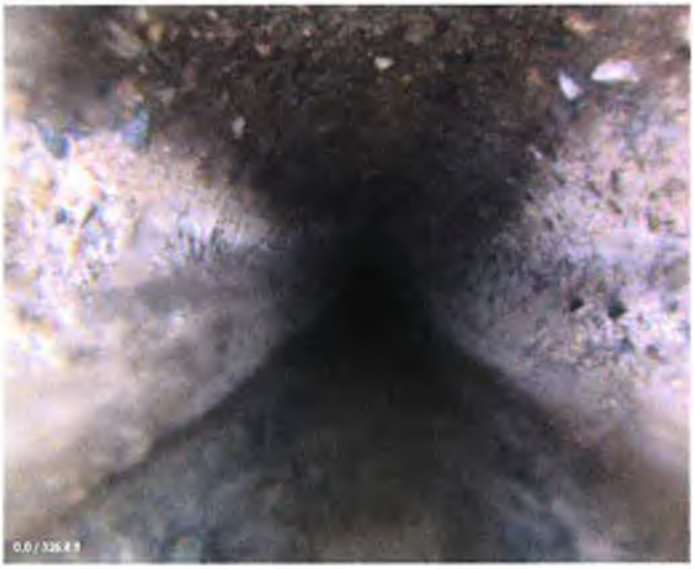
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values			8" of Joint	Clock	
						1st	2nd	%		From	To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	10% of cross sectional area				10	☐		
3	0	SAP	Surface Aggregate Projecting	from 7 to 5 o'clock NOT within 8" of joint Start	S01				☐	7	5
2	1.4	FC	Fracture Circumferential	from 8 to 4 o'clock NOT within 8" of joint					☐	8	4
3	13	FL	Fracture Longitudinal	at 11 o'clock within 8" of joint					☑	11	

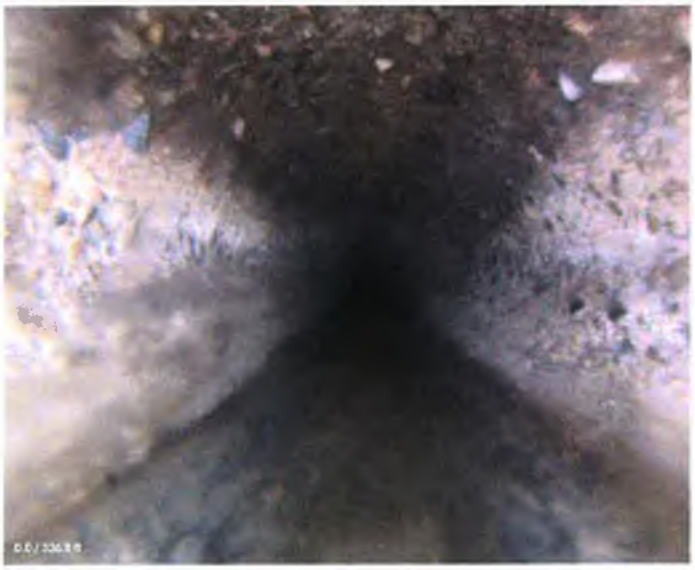
-	22.5	MGO	General Observation	Remarks: Begin using rear camera due to poor quality images from front camera. Clocking angles are from front camera point of view.					☐		
3	25.8	CM	Crack Multiple	from 10 to 12 o'clock within 8" of joint					☑	10	12
4	31.8	FM	Fracture Multiple	from 12 to 2 o'clock within 8" of joint					☑	12	2
4	44.1	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint Start	S02				☑	10	2
-	50.1	MGP	General Photo						☐		
-	55.9	MMC	Material Change	Remarks: Vitrified clay					☐		
-	56.9	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	58.5	MMC	Material Change	Remarks: Concrete					☐		
1	88.4	VC	Vermin Cockroach	NOT within 8" of joint					☐		
3	91.7	CM	Crack Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3
-	92.7	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	100.1	MGP	General Photo						☐		
-	124.3	MMC	Material Change	Remarks: Vitrified clay					☐		
-	125.3	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	126.8	MMC	Material Change	Remarks: Concrete					☐		
-	132.1	TB	Tap Break-in	at 11 o'clock		4			☐	11	
-	150.4	MGP	General Photo						☐		
-	200.6	MGP	General Photo						☐		
-	250.8	MGP	General Photo						☐		
-	300.7	MGP	General Photo						☐		
4	314.6	MCU	Camera Underwater	NOT within 8" of joint					☐		
4	326.8	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint End	F02				☑	10	2
3	326.8	SAP	Surface Aggregate Projecting	from 7 to 5 o'clock NOT within 8" of joint End	F01				☐	7	5
-	326.8	AMH	Manhole	Remarks: End of survey					☐		



PACP Code:	AMH		
Description:	Manhole		
Image Name:	1729db39-272d-49e0-8d8f-32b76512f8b4_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

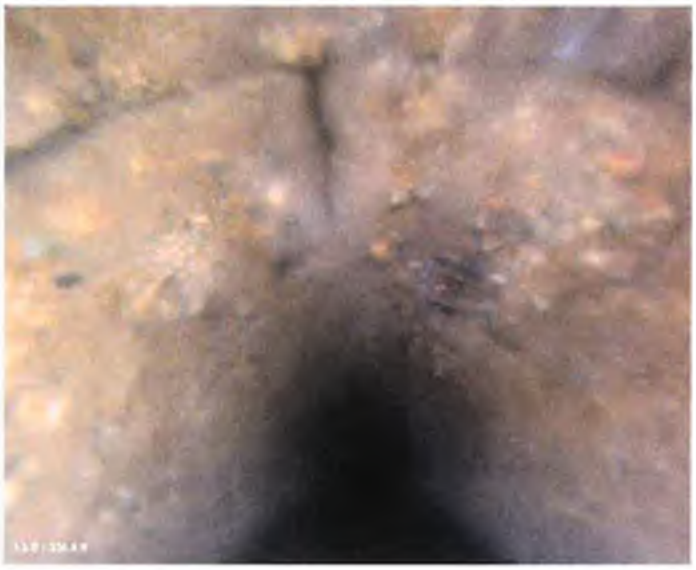


PACP Code:	MWL		
Description:	Water Level		
Image Name:	3652a5f4-afda-426c-8a9c-6c6064e39ab2_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

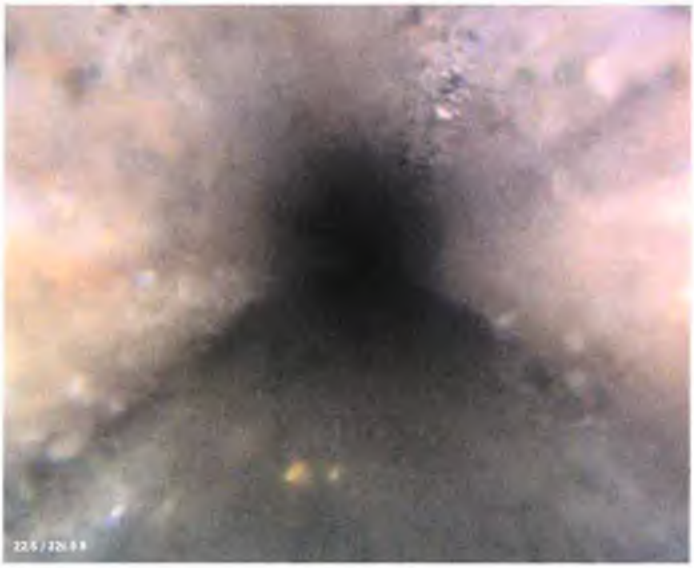


PACP Code:	SAP		
Description:	Surface Aggregate Projecting		
Image Name:	4c7bdd8e-dfa4-417f-84ef-d016f954666d_0-SAP.jpg		
Distance (ft):	0		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	7	Clock To:	5
1st Value:		2nd Value:	
Continuous Index:	S01	Within 8" of Joint:	☐
Remarks:			

PACP Code:	FC		
Description:	Fracture Circumferential		
Image Name:	48558228-eed5-4ca1-a726-8b119ca4e90d_1.4-FC.jpg		
Distance (ft):	1.4		
Structural Grade:	2	Maintenance Grade	0
Percent Value:			
Clock At/From:	8	Clock To:	4
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**b2215f8f-e551-46cc-9453-9df4612587a8_13-FL.jpg**		
Distance (ft):	**13**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



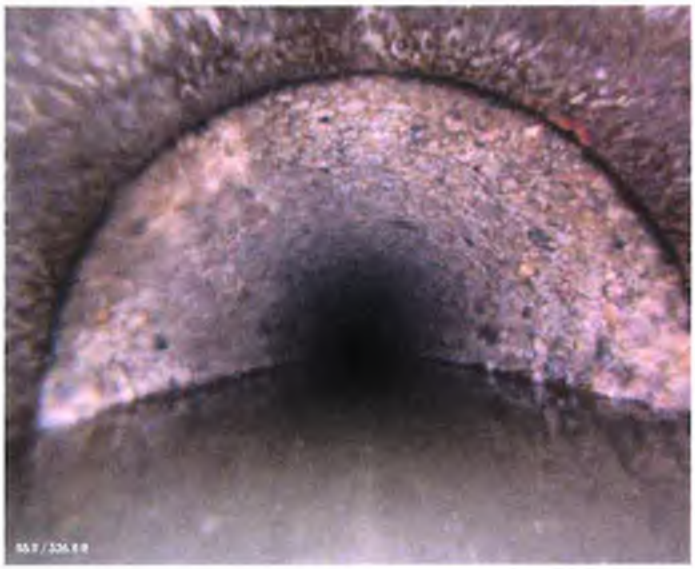
PACP Code:	MGO		
Description:	**General Observation**		
Image Name:	**99f79b53-068b-4f60-95d7-a53ce1ac6301_22.5-MGO.jpg**		
Distance (ft):	**22.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Begin using rear camera due to poor quality images from front camera. Clocking angles are from front camera point of view.**		

PACP Code:	CM		
Description:	**Crack Multiple**		
Image Name:	**19a64271-d2b7-4ef9-ae76-9f6c37758dcf_25.8-CM.jpg**		
Distance (ft):	**25.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**12**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

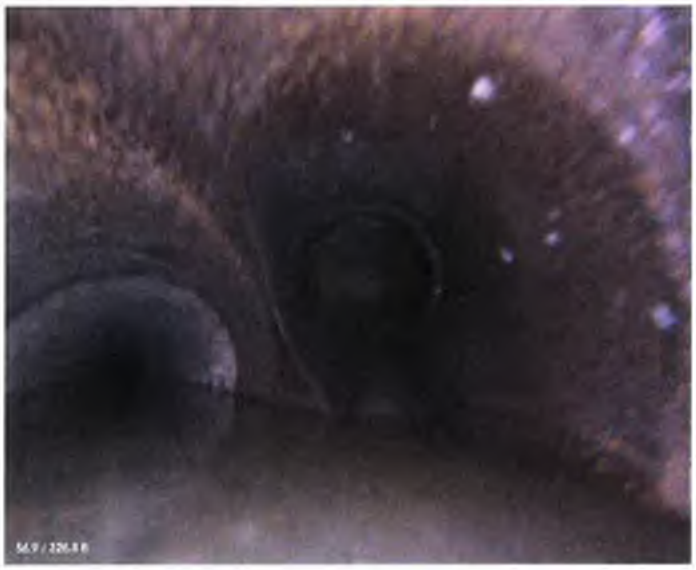
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**8ed39579-c1b6-4f7a-9f00-b09483e408cd_31.8-FM.jpg**		
Distance (ft):	**31.8**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**76f8b033-ba1f-48e7-a35b-0b949a60e0b1_44.1-FM.jpg**		
Distance (ft):	**44.1**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:	**S02**	Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**196cf458-4c70-4260-8a6a-cfb5dce65d1b_50.1-MGP.jpg**		
Distance (ft):	**50.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



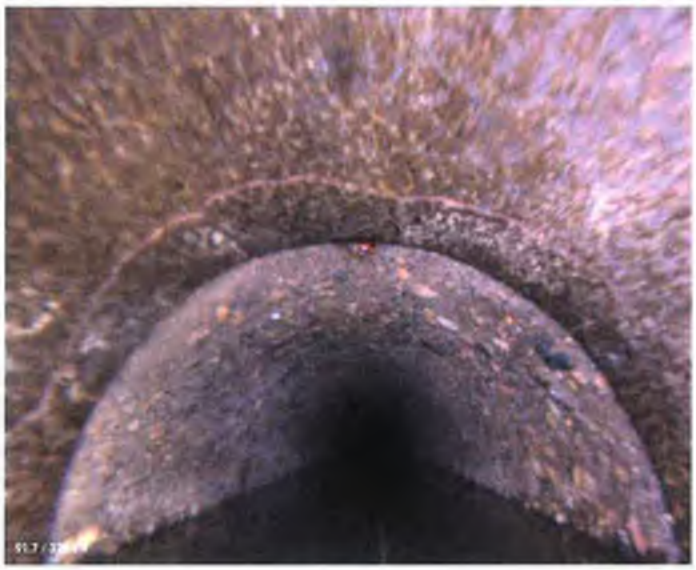
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**3193e0a9-d083-404f-9655-b76ab37e6442_55.9-MMC.jpg**		
Distance (ft):	**55.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



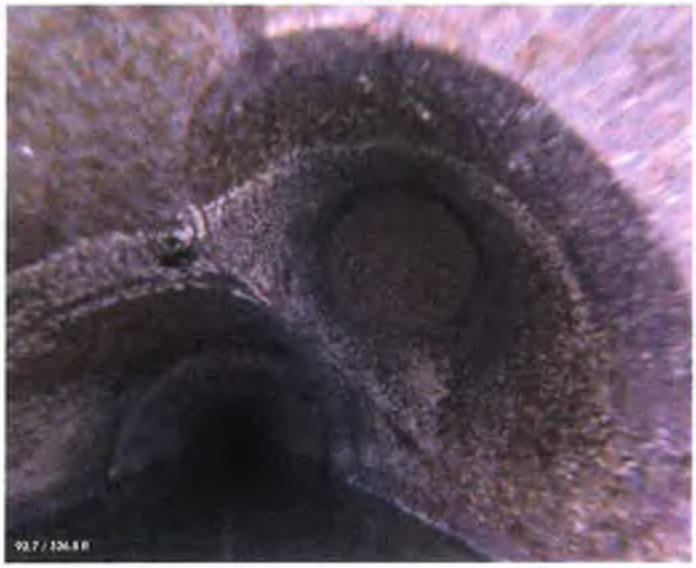
PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**37d31362-dfae-4aca-aa4a-8af830bfbcd5_56.9-TFC.jpg**		
Distance (ft):	**56.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**b9038740-4869-425f-ab78-bb29b737abe2_58.5-MMC.jpg**		
Distance (ft):	**58.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	VC		
Description:	Vermin Cockroach		
Image Name:	5a2142f2-f75b-4cf8-ad7e-9fb158e0491a_88.4-VC.jpg		
Distance (ft):	88.4		
Structural Grade:	0	Maintenance Grade	1
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

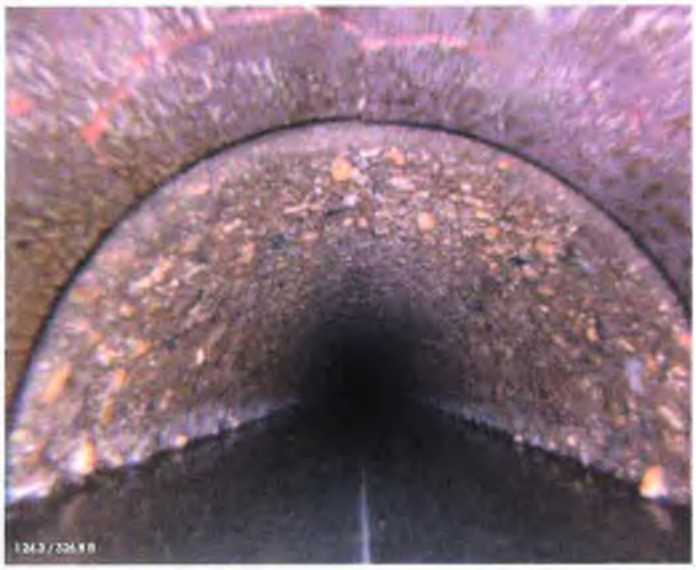


PACP Code:	CM		
Description:	Crack Multiple		
Image Name:	59dda762-dc56-4e18-aa0f-3bd84934e2d2_91.7-CM.jpg		
Distance (ft):	91.7		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	9	Clock To:	3
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

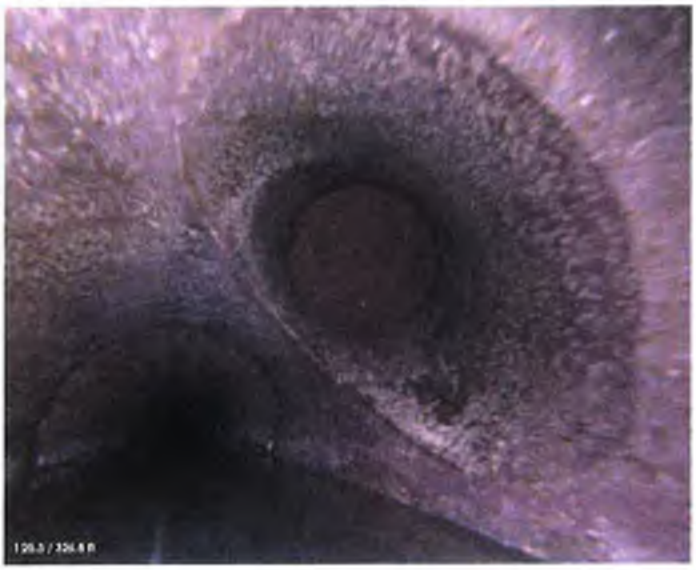


PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	ebeaf3d4-6ae4-4771-9ac4-fa8e9f5b69cf_92.7-TFC.jpg		
Distance (ft):	92.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	2205ff50-589f-4990-a2e9-0f5ab731dec8_100.1-MGP.jpg		
Distance (ft):	100.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	MMC		
Description:	Material Change		
Image Name:	293ea48c-7277-4831-ab53-3be02cf06aba_124.3-MMC.jpg		
Distance (ft):	124.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Vitrified clay		



PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	bcb5e2ae-2fbf-4f07-8fb3-acb31dbe985c_125.3-TFC.jpg		
Distance (ft):	125.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

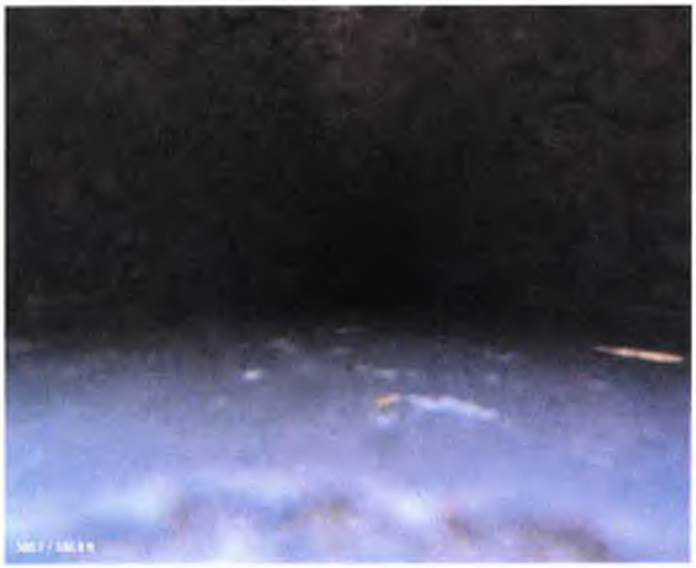
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**aae15cf1-15dc-4132-bf67-a07aba7a6043_126.8-MMC.jpg**		
Distance (ft):	**126.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**TB**		
Description:	**Tap Break-in**		
Image Name:	**8e8d8d45-d3c0-468d-a768-8328970dcfe2_132.1-TB.jpg**		
Distance (ft):	**132.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

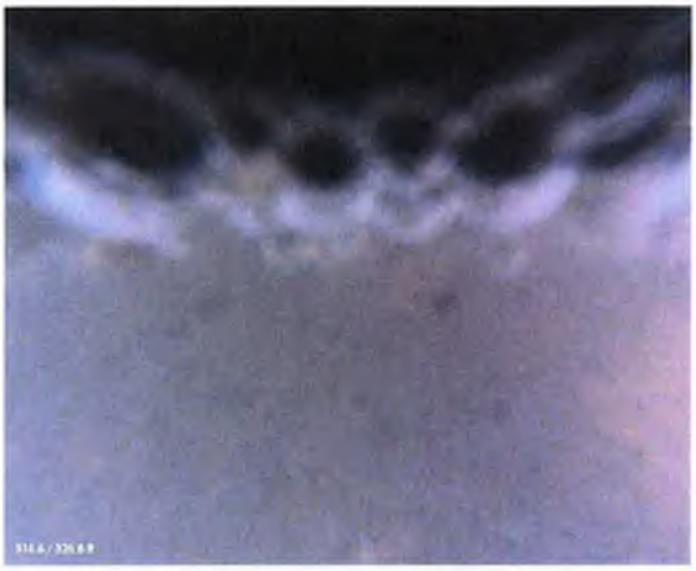
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**5f623042-5741-4c5a-8df5-ced3a55bca02_150.4-MGP.jpg**		
Distance (ft):	**150.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**2815fad4-7b2d-4472-8b34-2aade9fe0ad8_200.6-MGP.jpg**		
Distance (ft):	**200.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**44597261-7077-4e7c-9234-a69211c61a66_250.8-MGP.jpg**		
Distance (ft):	**250.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

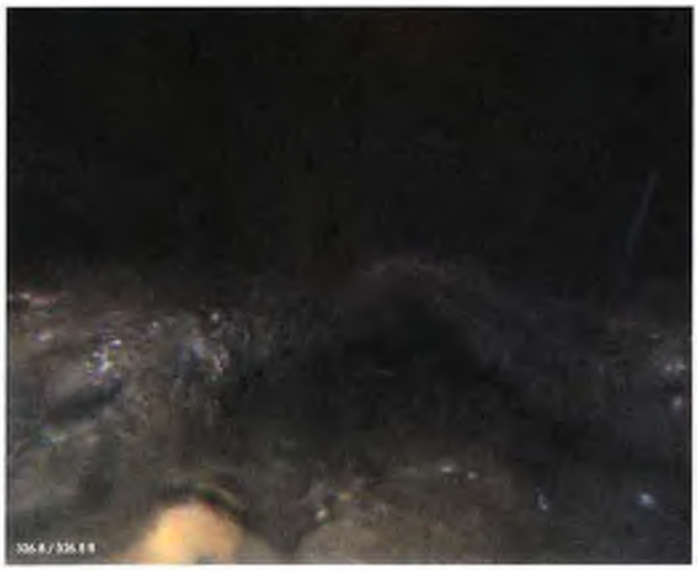


PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**17fab483-0370-443b-a110-05f11aa96421_300.7-MGP.jpg**		
Distance (ft):	**300.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MCU**		
Description:	**Camera Underwater**		
Image Name:	**f42e2e4c-f35c-49ef-8ba4-161576e44996_314.6-MCU.jpg**		
Distance (ft):	**314.6**		
Structural Grade:	**0**	Maintenance Grade	**4**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**ecc906c0-c102-4807-96bb-27cde24d534b_326.8-FM.jpg**		
Distance (ft):	**326.8**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:	**F02**	Within 8" of Joint:	☑
Remarks:			



PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**d9f01f76-5c96-4f65-8e80-aaa5b44bcb16_326.8-SAP.jpg**		
Distance (ft):	**326.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**7**	Clock To:	**5**
1st Value:		2nd Value:	
Continuous Index:	**F01**	Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**c5a865a5-a30e-4e22-9275-a9ef4565bde9_326.8-AMH.jpg**		
Distance (ft):	**326.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-2002 to 07-2001	07-2002	07-2001	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		0	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
N. Hill St.	City of Arvin	Light Highway	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	04:06 PM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		428
Media Label	Reverse Setup	Work Order No	Additional Info	
NS23-1463	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
277	276	1
Overall Index	Structural Index	Maintenance Index
2.98	3	1
Overall Quick	Structural Quick	Maintenance Quick
3Q11	3Q00	1100

* has 2010 Report but no 2010 video

* has 2015 video and no 2015 Report

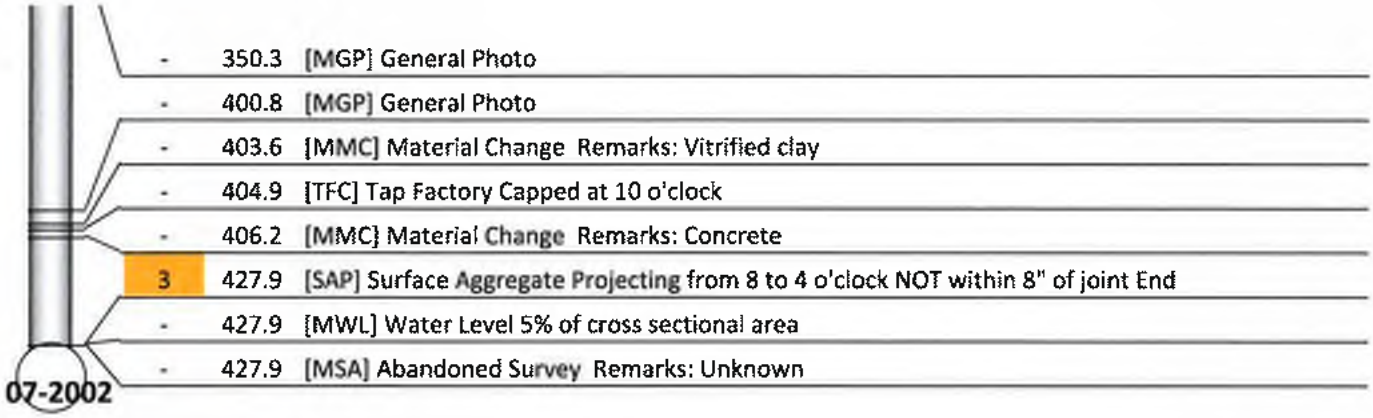
* attached Harn's 2015 CCTV Observation Report Sheet

Open Trench Pipe Replacement (Pipe Bursting Candidate)

07-2001

Camera Direction

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 40% of cross sectional area
3	0	[SAP] Surface Aggregate Projecting from 8 to 4 o'clock NOT within 8" of joint Start
1	1.1	[VC] Vermin Cockroach NOT within 8" of joint
3	6.2	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	50.6	[MGP] General Photo
-	63.5	[MMC] Material Change Remarks: Vitrified clay
-	65	[TF] Tap Factory at 11 o'clock
-	66.3	[MMC] Material Change Remarks: Concrete
-	90.4	[MMC] Material Change Remarks: Vitrified clay
-	91.6	[TF] Tap Factory at 10 o'clock
-	92.9	[MMC] Material Change Remarks: Concrete
-	94.5	[MWL] Water Level 25% of cross sectional area
-	100.3	[MGP] General Photo
-	138.1	[MMC] Material Change Remarks: Vitrified clay
-	139.4	[TF] Tap Factory at 10 o'clock
-	140.8	[MMC] Material Change Remarks: Concrete
3	161.5	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	170.3	[FL] Fracture Longitudinal at 2 o'clock within 8" of joint
3	176.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	188.8	[MMC] Material Change Remarks: Vitrified clay
-	190	[TF] Tap Factory at 10 o'clock
-	191.3	[MMC] Material Change Remarks: Concrete
-	200.8	[MGP] General Photo
-	235.5	[MWL] Water Level 40% of cross sectional area
-	239.5	[MMC] Material Change Remarks: Vitrified clay
-	240.9	[TF] Tap Factory at 10 o'clock
-	242.2	[MMC] Material Change Remarks: Concrete
-	250.7	[MGP] General Photo
-	286.1	[TBA] Tap Break-in Active at 12 o'clock
-	290.4	[MMC] Material Change Remarks: Vitrified clay
-	291.6	[TFC] Tap Factory Capped at 10 o'clock
3	292.6	[CM] Crack Multiple from 11 to 1 o'clock within 8" of joint
-	293.3	[MMC] Material Change Remarks: Concrete
-	300.2	[MGP] General Photo
3	337.8	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint
-	346.1	[TB] Tap Break-in at 12 o'clock
-	346.9	[MMC] Material Change Remarks: Vitrified clay
-	348.2	[TFC] Tap Factory Capped at 10 o'clock
-	349.6	[MMC] Material Change Remarks: Concrete



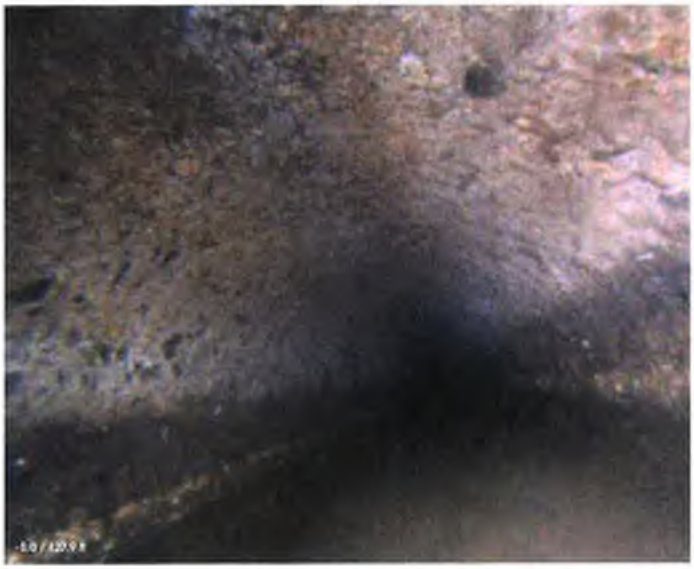
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values			8" of Joint	Clock	
						1st	2nd	%		From	To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	40% of cross sectional area				40	☐		
3	0	SAP	Surface Aggregate Projecting	from 8 to 4 o'clock NOT within 8" of joint Start	S01				☐	8	4
1	1.1	VC	Vermin Cockroach	NOT within 8" of joint					☐		
3	6.2	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	50.6	MGP	General Photo						☐		
-	63.5	MMC	Material Change	Remarks: Vitrified clay					☐		
-	65	TF	Tap Factory	at 11 o'clock		4			☐	11	
-	66.3	MMC	Material Change	Remarks: Concrete					☐		
-	90.4	MMC	Material Change	Remarks: Vitrified clay					☐		
-	91.6	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	92.9	MMC	Material Change	Remarks: Concrete					☐		
-	94.5	MWL	Water Level	25% of cross sectional area				25	☐		
-	100.3	MGP	General Photo						☐		
-	138.1	MMC	Material Change	Remarks: Vitrified clay					☐		
-	139.4	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	140.8	MMC	Material Change	Remarks: Concrete					☐		
3	161.5	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	170.3	FL	Fracture Longitudinal	at 2 o'clock within 8" of joint					☑	2	
3	176.4	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	188.8	MMC	Material Change	Remarks: Vitrified clay					☐		
-	190	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	191.3	MMC	Material Change	Remarks: Concrete					☐		
-	200.8	MGP	General Photo						☐		
-	235.5	MWL	Water Level	40% of cross sectional area				40	☐		
-	239.5	MMC	Material Change	Remarks: Vitrified clay					☐		
-	240.9	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	242.2	MMC	Material Change	Remarks: Concrete					☐		
-	250.7	MGP	General Photo						☐		
-	286.1	TBA	Tap Break-in Active	at 12 o'clock		4			☐	12	
-	290.4	MMC	Material Change	Remarks: Vitrified clay					☐		
-	291.6	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
3	292.6	CM	Crack Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1

-	293.3	MMC	Material Change	Remarks: Concrete					☐		
-	300.2	MGP	General Photo						☐		
3	337.8	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
-	346.1	TB	Tap Break-in	at 12 o'clock		4			☐	12	
-	346.9	MMC	Material Change	Remarks: Vitrified clay					☐		
-	348.2	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	349.6	MMC	Material Change	Remarks: Concrete					☐		
-	350.3	MGP	General Photo						☐		
-	400.8	MGP	General Photo						☐		
-	403.6	MMC	Material Change	Remarks: Vitrified clay					☐		
-	404.9	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	406.2	MMC	Material Change	Remarks: Concrete					☐		
3	427.9	SAP	Surface Aggregate Projecting	from 8 to 4 o'clock NOT within 8" of joint End	F01				☐	8	4
-	427.9	MWL	Water Level	5% of cross sectional area				5	☐		
-	427.9	MSA	Abandoned Survey	Remarks: Unknown					☐		

PACP Code:	AMH		
Description:	Manhole		
Image Name:	062cad83-c953-4a40-a401-77fac22e8ddf_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

PACP Code:	MWL		
Description:	Water Level		
Image Name:	227b70c9-6da9-44a8-ab16-76caf3a4b5eb_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	40		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



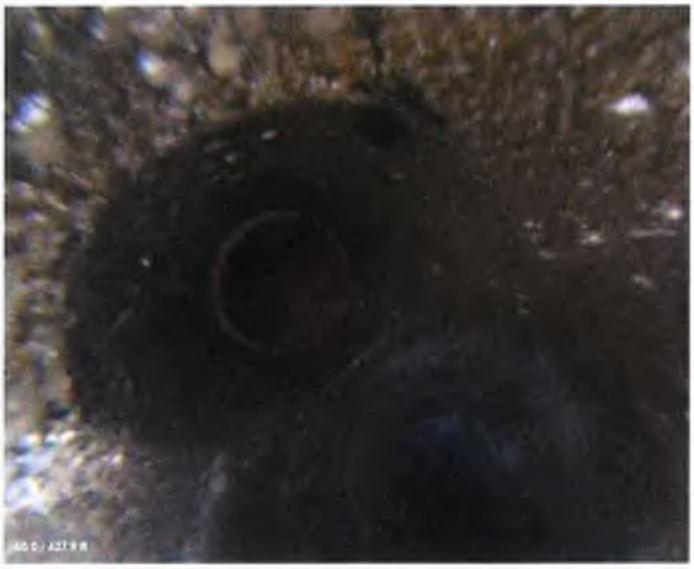
PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**773adeaa-c2c9-4c13-bb8e-d3e1c53794c8_0-SAP.jpg**		
Distance (ft):	**0**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:	**S01**	Within 8" of Joint:	☐
Remarks:			

PACP Code:	**VC**		
Description:	**Vermin Cockroach**		
Image Name:	**480810b1-755c-406e-b684-13000ed79290_1.1-VC.jpg**		
Distance (ft):	**1.1**		
Structural Grade:	**0**	Maintenance Grade	**1**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

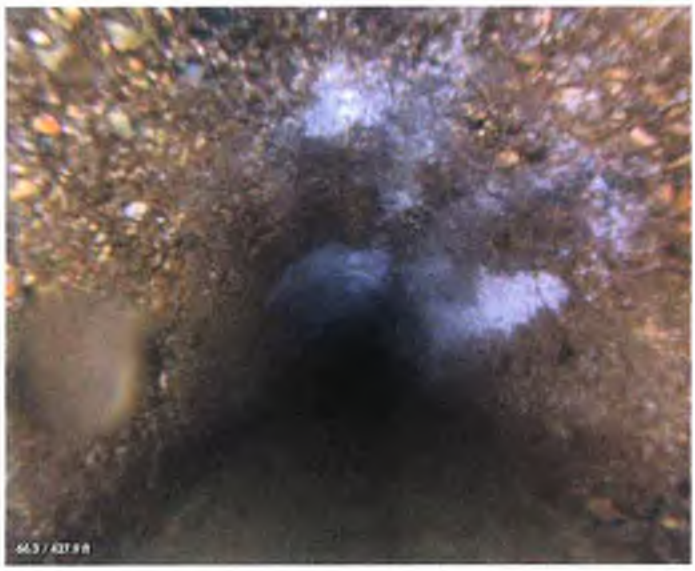
PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**0010b0dc-cf00-4aaf-8b23-56724572b101_6.2-FL.jpg**		
Distance (ft):	**6.2**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**e58009f6-468c-4c8f-b9be-c3e3b9117e5c_50.6-MGP.jpg**		
Distance (ft):	**50.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**63802771-6ab8-4a07-a79e-17fd2a4ffd2d_63.5-MMC.jpg**		
Distance (ft):	**63.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

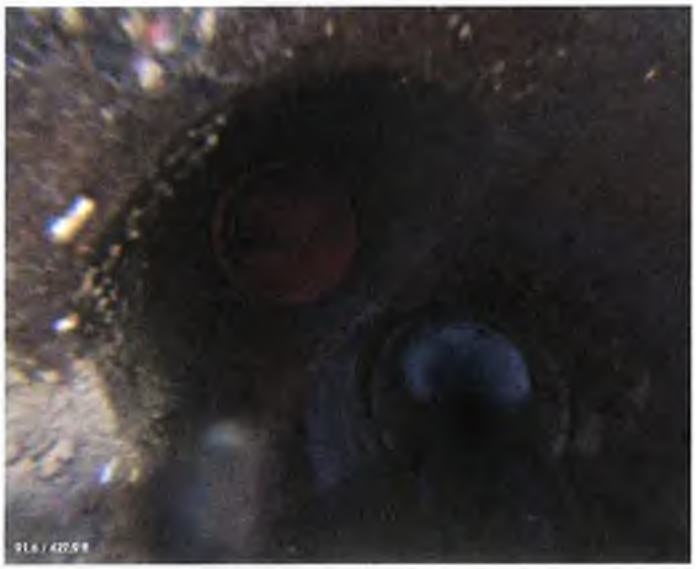


PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**9786e5cb-a911-484d-bf1e-378f217a2f5b_65-TF.jpg**		
Distance (ft):	**65**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**44330732-d2cc-4a8e-a34e-0ebfadfc7b12_66.3-MMC.jpg**		
Distance (ft):	**66.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**731bd41e-aad8-484f-8d4b-5fd19ca723ed_90.4-MMC.jpg**		
Distance (ft):	**90.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**bd35f902-2e5c-4ecb-9441-a4976d647bae_91.6-TF.jpg**		
Distance (ft):	**91.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

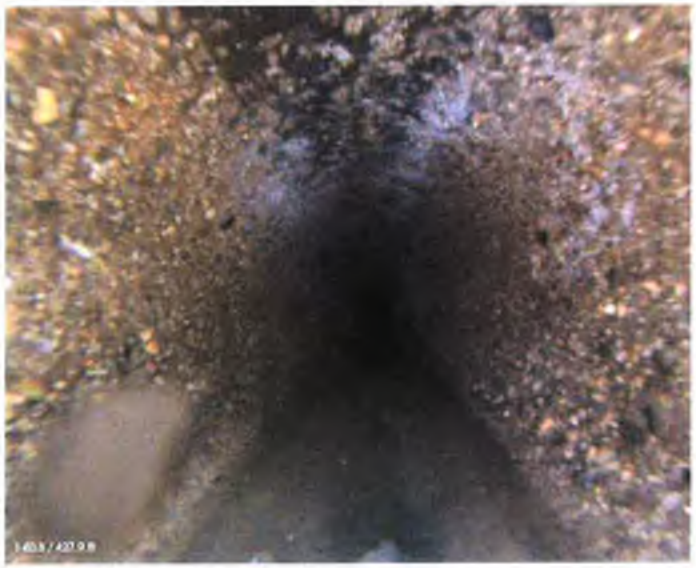
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**9fd4675d-f4aa-4699-b6bb-970187c33ef1_92.9-MMC.jpg**		
Distance (ft):	**92.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**eeb45258-c7ef-43fa-87cc-0ef507956f06_94.5-MWL.jpg**		
Distance (ft):	**94.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**25**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**529666bd-6903-4d0f-b416-b7c481a02882_100.3-MGP.jpg**		
Distance (ft):	**100.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	9e4300cc-24ce-49c6-b7f8-db1b4cba4124_138.1-MMC.jpg		
Distance (ft):	138.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Vitrified clay		

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	f2ec4617-8bbe-462f-b2ac-b36388f83786_139.4-TF.jpg		
Distance (ft):	139.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

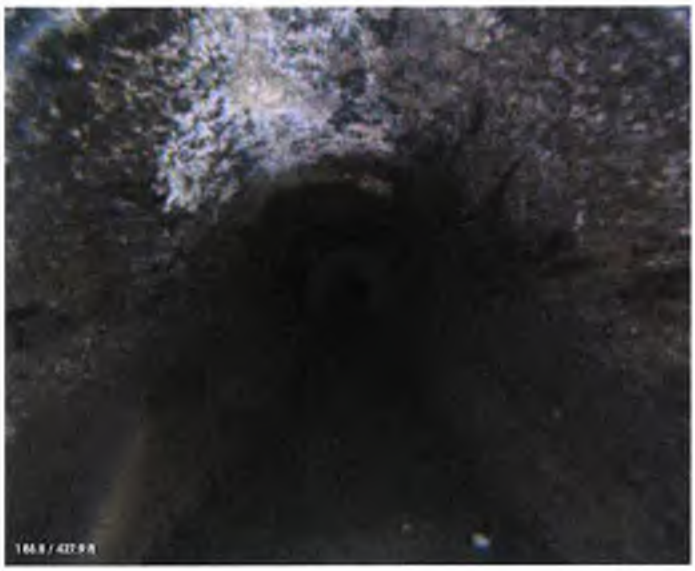


PACP Code:	MMC		
Description:	Material Change		
Image Name:	ad281c2f-9afd-4768-be1b-555f8a06bfb6_140.8-MMC.jpg		
Distance (ft):	140.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		

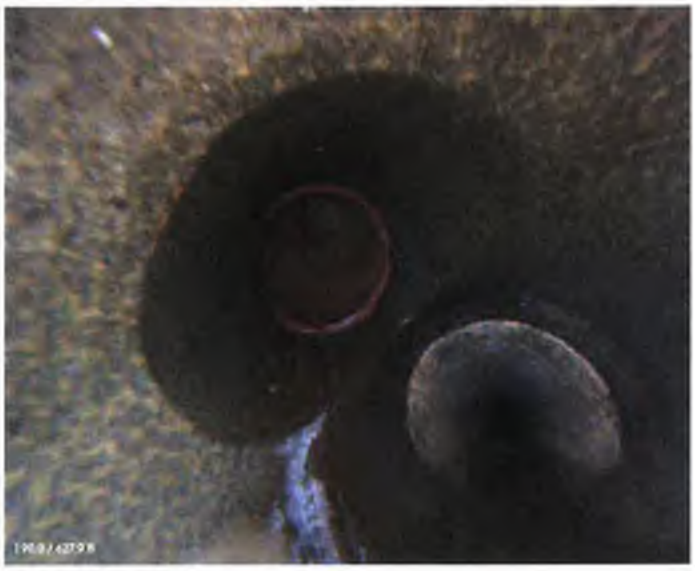
PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**fdc98082-bc5c-4462-9820-ab97c83cb41f_161.5-FL.jpg**		
Distance (ft):	**161.5**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**7e65839c-769f-41f3-9a39-135fa06ddc6a_170.3-FL.jpg**		
Distance (ft):	**170.3**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**9c764f83-f7cb-45b3-af84-07f5a69d93ed_176.4-FL.jpg**		
Distance (ft):	**176.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**69610c17-7301-4cdd-bbc4-e3561a7907c8_188.8-MMC.jpg**		
Distance (ft):	**188.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

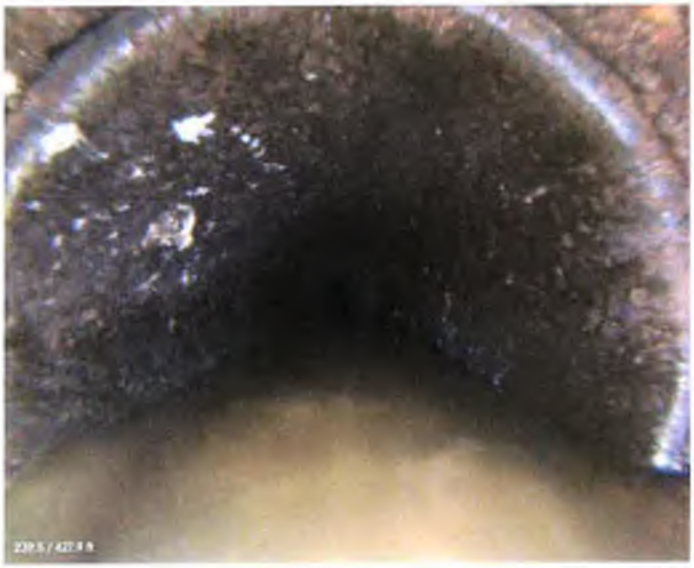


PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**514074f5-94fe-46be-a987-36d5f4285e71_190-TF.jpg**		
Distance (ft):	**190**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**ab4c8b6a-9775-44bc-8762-50a77f42c6c1_191.3-MMC.jpg**		
Distance (ft):	**191.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**7a5f5140-0bfd-4a34-8fb1-35633e2e02cb_200.8-MGP.jpg**		
Distance (ft):	**200.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**1fd7f9b5-b0d0-4819-bd18-f9cb447575dd_235.5-MWL.jpg**		
Distance (ft):	**235.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**40**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**7b44bc5f-f147-4a6c-a9a1-1b8753035cd3_239.5-MMC.jpg**		
Distance (ft):	**239.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

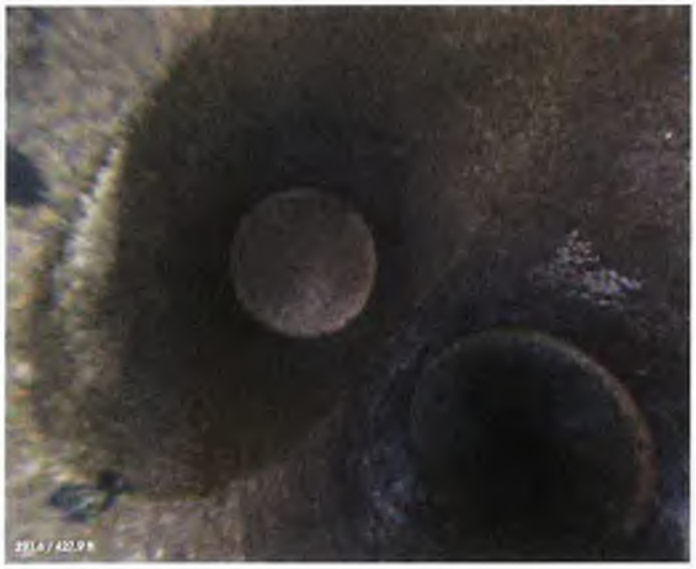
PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**35cc58fc-776c-4573-8537-e09d748df158_240.9-TF.jpg**		
Distance (ft):	**240.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**ff672add-6329-4e6c-afba-60e52e04ce22_242.2-MMC.jpg**		
Distance (ft):	**242.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**5f11691b-52de-4f99-b0c4-cc1eda3ec225_250.7-MGP.jpg**		
Distance (ft):	**250.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TBA		
Description:	**Tap Break-in Active**		
Image Name:	**54da6ef4-3308-41ea-82e1-58ee60371bac_286.1-TBA.jpg**		
Distance (ft):	**286.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MMC		
Description:	**Material Change**		
Image Name:	**26d0115a-2bd7-4b90-998e-8d1184e94203_290.4-MMC.jpg**		
Distance (ft):	**290.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	TFC		
Description:	**Tap Factory Capped**		
Image Name:	**c0fe44ce-8f18-4fd3-9ba0-067c66acb97e_291.6-TFC.jpg**		
Distance (ft):	**291.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

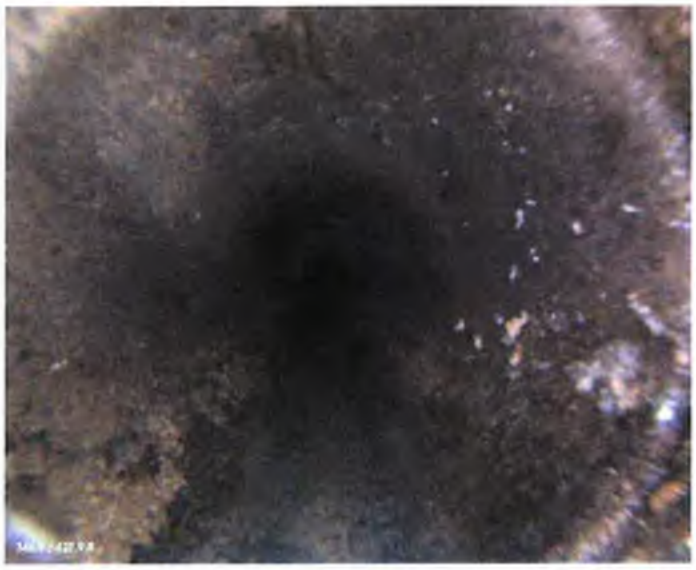
PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**4c0659d7-75f4-421b-ace3-b70fef4775f6_292.6-CM.jpg**		
Distance (ft):	**292.6**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**33de702f-2a95-47f1-b0ab-11a0e6a14748_293.3-MMC.jpg**		
Distance (ft):	**293.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**143d10bc-ab3c-4029-b922-5ecc2550d933_300.2-MGP.jpg**		
Distance (ft):	**300.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**da4468a4-8656-4b59-af21-d83cea35b22b_337.8-FL.jpg**		
Distance (ft):	**337.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**TB**		
Description:	**Tap Break-in**		
Image Name:	**8bf19204-2e03-4b2d-be38-db6705406e9e_346.1-TB.jpg**		
Distance (ft):	**346.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**b5be649e-0624-472f-9c60-9148f83e5135_346.9-MMC.jpg**		
Distance (ft):	**346.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**6b0d874b-c80a-4e28-95b8-8347d0b67158_348.2-TFC.jpg**		
Distance (ft):	**348.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**7b99c3d1-730a-4921-aab1-e7b9971aa3ca_349.6-MMC.jpg**		
Distance (ft):	**349.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**a9debb55-a71b-4247-bde9-b978fe02835e_350.3-MGP.jpg**		
Distance (ft):	**350.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	d987a0c8-7675-473b-b4c4-a536a940b459_400.8-MGP.jpg		
Distance (ft):	400.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	db0261f4-4d05-494b-8595-fb13489af887_403.6-MMC.jpg		
Distance (ft):	403.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Vitrified clay		

PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	05b72a11-106e-4683-b58f-1f3b0082bed0_404.9-TFC.jpg		
Distance (ft):	404.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**462af007-05a1-494c-b71f-155708a3023b_406.2-MMC.jpg**		
Distance (ft):	**406.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**a7a36793-a6c1-4b00-ab19-0348b74b5a63_427.9-SAP.jpg**		
Distance (ft):	**427.9**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:	**F01**	Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**ffb60af1-f0e9-46ec-ac26-c6168b4bfcc2_427.9-MWL.jpg**		
Distance (ft):	**427.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**5**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

Joints every 3 ft

CCTV Observation Report

Harris & Associates

2015 Date: ~~[illegible]~~ Owner: City of Arvin Pre Clean:
Pipe Length Surveyor: Shape: Circular
Customer: Veolia Weather: Dry Reach: 07-2002 to 07-2001

Street: N. Hill St Flow Control: Not Controlled
City: Arvin Dia/Height (in): 8
Use: Sanitary Material: Concrete Survey Direction: ~~Upstream~~ Downstream
US Manhole: 07-2002 DS Manhole: 07-2001 Total Length Surveyed:

Position	Code	Observation	Video (sec)	Grade
		Surface Aggregate Visible		
35	CM	Crack Multiple (J35-		S3
35.5	TF	Tap Factory (needs to be replaced)		M3
43	SS	Surface Spalling (continuous)		S2
84.4	DSF	Deposits Settled (Fine)		M2
105	DSF	Deposits settled (Fine)		M2
122.5	TB	Tap Break In		N/A
150	MGP	General Photo (WL=5%)		N/A
156	TFC	Tap Factory Capped		N/A
156	CS	Crack Spiral		S3
171.1	TB	Tap Break In		
179.6	TB	Tap Break In		
205	CC	Crack Multiple (Circumferential) @ Joint (J205-208)		S3
206.8	TFC	Tap Factory Capped		N/A
225	MWLS	Water Level Sag (start)		
235	MWLS	Water level Sag (End)		
262	CC	Crack Circumfrential @ Joint (J262-265)		S3
263.3	TFC	Tap Factory Capped		
265.4	TB	Tap Break in @ Close to joint		
320.1	TFC	Tap Factory Capped		N/A
325.9	TB	Tap Break in		N/A
330	MWLS	Water Level Sag (20%)		N/A
340	↓	Water Level Sag (End)		N/A
364	CC	Crack Circumfrential @ Joint		N/A
371	TF	Tap Factory		
420	CC	Crack Circumfrential @ Joint		S3

• wall material is really degraded

continued.....

CCTV Observation Report

Harris & Associates

Date:	Owner:	Pre Clean:
Pipe Length	Surveyor:	Shape:
Customer:	Weather:	Reach:

Street:	Flow Control:	
City:	Dia/Height (in):	
Use:	Material:	Survey Direction:
US Manhole:	DS Manhole:	Total Length Surveyed:

Position	Code	Observation	Video (sec)	Grade
422	TFA	Tap Factory Active		N/A
470	CM	Crack Multiple		S3
471.3	TF	Tap Factory		
520	CM	Crack Multipe		S3
520	TF	Tap Factory		
545	CM	Crack Multiple		S3
545.4	TF	Tap Factory		
614.4	MH	Manhole		N/A

- water level sag at the end of the pipe
- multiple cracks, condition of the pipe interior needs unuch improvement
- due to the excessive amount of spot repairs and water level sags, open trench Pipe replacement is recommended

Recommendation

- Open Trench Pipe Replacement

*mouse attached the camera

6/27

CCTV Observation Report

Harris & Associates

Date: 10-27-2010 Owner: Arvin
Pipe Length 283.9 (Surveyed) Surveyor:
Customer: Arvin Weather:

Pre Clean:
Shape: Circular
Reach: ~~07-2002 07-0006~~ 07-2001 to 07-0006

Street: N. Hill St
City: City of Arvin
Use: Sanitary
US Manhole: 07-2001

Flow Control:
Dia/Height (in): 8 in
Material: RCP
DS Manhole: 07-0006

Survey Direction: Downstream
Total Length Surveyed: 283.8

Position	Code	Observation	Video (sec)	Grade
0		Waterlevel (10%)	0	N/A
0.9		Fracture Circumfrential		S3
2.2	SAV	Surface Aggregate Visible		S3
48.2	DAGS	Deposit Attached Grease		M3
48.2	CL	Crack Longitudinal		S2
53	MGP	General Photo (WL=10%)		N/A
56.1	TF	Tap Factory		N/A
58	MWL	Water Level (40%)		N/A
65	CL	Crack Longitudinal		S2
91.3	RFJ	Roots Fine Joint		M2
91.3	CM	Crack Multiple		S3
91.8	TF	Tap Factory		N/A
97.6	CM	Crack Multiple		S3
100.5	MGP	General Photo (15%)		N/A
124.6	TF	Tap Factory		N/A
131.5	TB	Tap Break-In		N/A
150.8	CL	Crack Longitudinal		S3
168.8	ID	Infil Dripper		S3
192.6	MWL	Water Level (10%)		N/A
200	MGP	General Photo (WL=10%)		N/A
217.3	MWL	Water Level (30%)		N/A
250.1	MGP	General Photo		N/A
253.2	RFJ	Roots Fine Joint		M2
259.3	RFJ	Roots Fine Joint		M2
262.3	RFJ	Roots Fine Joint		M2
281.2	SAV	Surface Aggregate Visible		S3
283.8	MSA	Abandon Survey		—

- Open Trench 284ft to MH 07-0006
- CIPP 284ft from MH 07-2001

Profile/Photo Observation Report

RedZone

Date:	10/27/2009	Weather:	Dry		
Pipe Length (ft):	321	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12016	Surveyor:	JJC	PSR:	07-2001 to 07-0006
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	N. Hill St.	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Light Highway	Tape/Media #:	NS6-820
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Reinforced Concrete Pipe
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Upstream

US MH: 07-2001 DS MH: 07-0006 Total Length Surveyed (ft): 321

Does not match video provided

Recommendation

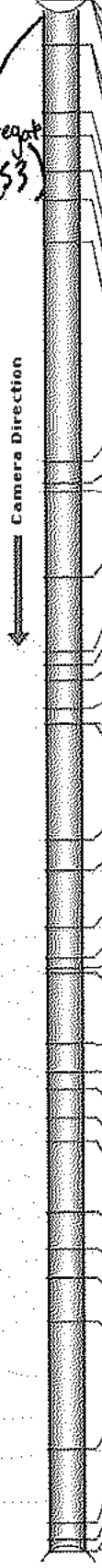
Spot Repair and CIPP Lining 284

284 to MH 07-0006

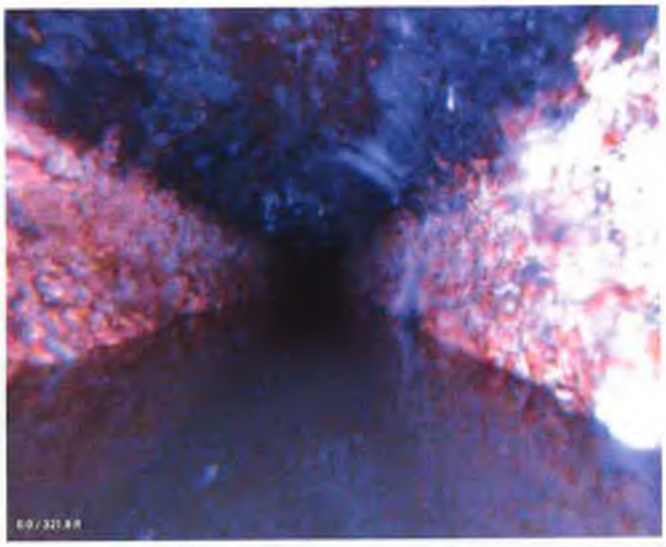
Joint every 3ft

07-0006

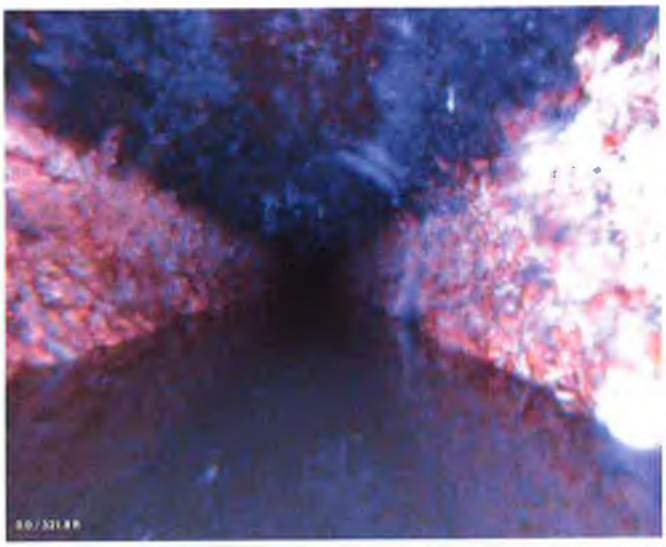
Surface Aggregate visible (S3)



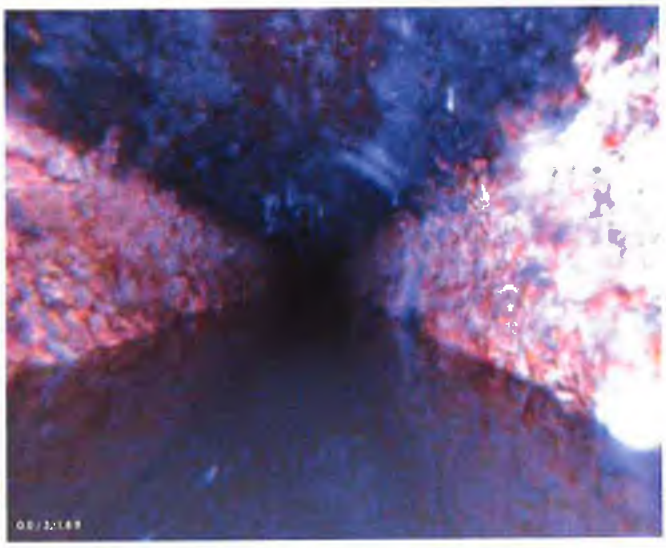
Position	Code	Observation	Video (sec)	Grade
0	AMH	Manhole	5	NA
0	MWL	Water Level	13	NA
0	DAGS	Deposits Attached Grease	21	M 3
.09		Fracture Circumferential	28	S 3
9.32	DAGS	Deposits Attached Grease	48	M 3
9.32	SAP	Surface Aggregate Projecting	56	S 3
23.36	FL	Fracture Longitudinal	93	S 3
28.27	MWL	Water Level	112	NA
35.6	HSV	Hole Soil Visible	135	S 5
41.54	SSS	Surface Spalling	157	S 2
50.3	MGP	General Photo	185	NA
95.59	CL	Crack Longitudinal	284	S 2
100.04	MGP	General Photo	302	NA
101.74	CL	Crack Longitudinal	314	S 2
119.72	CM	Crack Multiple	360	S 3
134.9	CL	Crack Longitudinal	399	S 2
137.81	CL	Crack Longitudinal	414	S 2
140.95	CM	Crack Multiple	429	S 3
146.93	CL	Crack Longitudinal	451	S 2
150.02	FL	Fracture Longitudinal	467	S 3
150.02	FL	Fracture Longitudinal	477	S 3
174.16	CL	Crack Longitudinal	535	S 2
180.37	CM	Crack Multiple	557	S 3
192.24	CL	Crack Longitudinal	592	S 2
198.36	CL	Crack Longitudinal	614	S 2
200.54	MGP	General Photo	628	NA
201.54	CM	Crack Multiple	638	S 3
216.44	CM	Crack Multiple	679	S 3
222.38	FL	Fracture Longitudinal	701	S 3
225.67	CL	Crack Longitudinal	716	S 2
231.62	FL	Fracture Longitudinal	738	S 3
236.58	MWL	Water Level	758	NA
251.24	MGP	General Photo	796	NA
258.87	FM	Fracture Multiple	819	S 4
264.9	FL	Fracture Longitudinal	841	S 3
274.01	FL	Fracture Longitudinal	869	S 3
300.46	MGP	General Photo	932	NA
315.87	FL	Fracture Longitudinal	971	S 3
319.34	HSV	Hole Soil Visible	987	S 5
321.78	SAP	Surface Aggregate Projecting	1001	S 3
321.78	AMH	Manhole	1010	NA



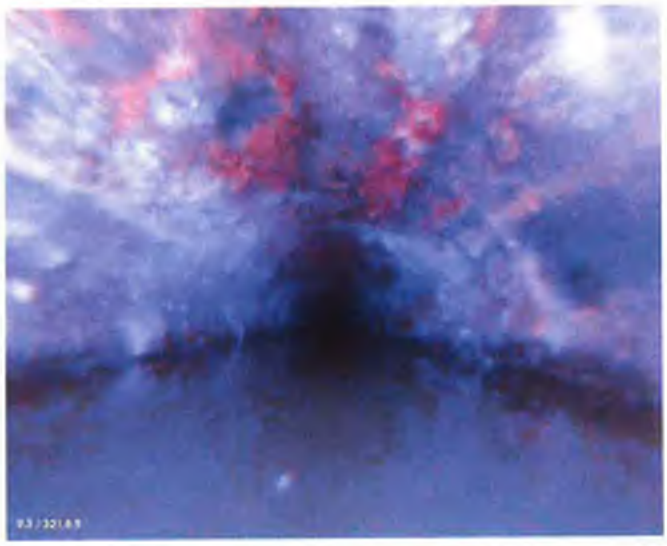
PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey



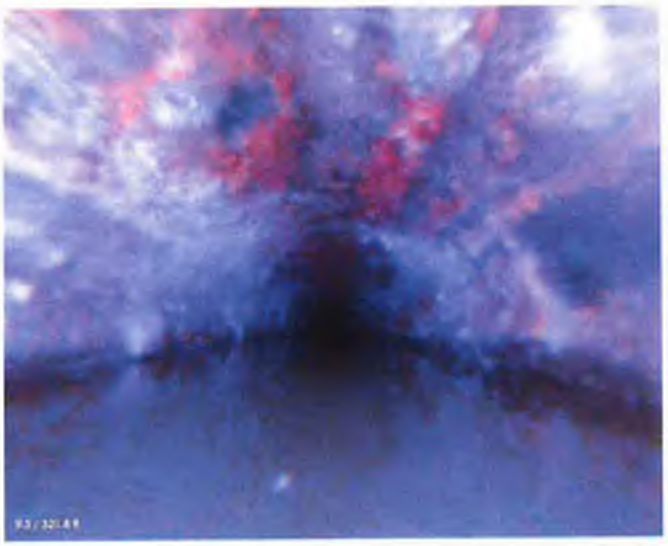
PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



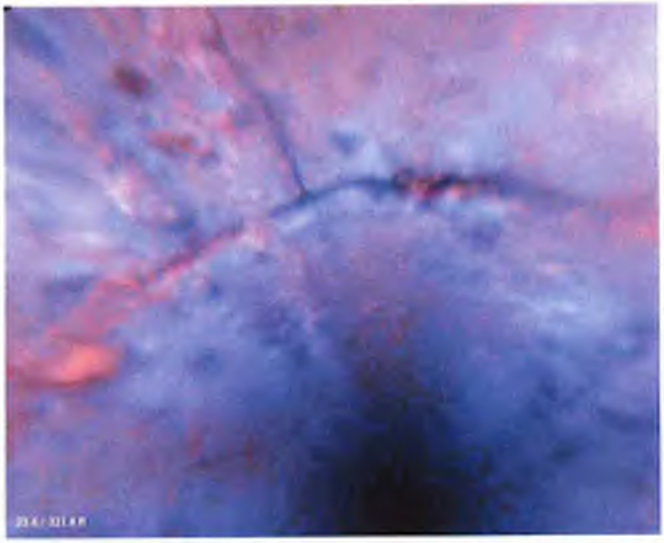
PACP Code:	DAGS
Description:	Deposits Attached Grease
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	S01
Within 8" of Joint:	False
Remarks:	



PACP Code:	DAGS
Description:	Deposits Attached Grease
Distance (ft):	9.32
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	F01
Within 8" of Joint:	False
Remarks:	

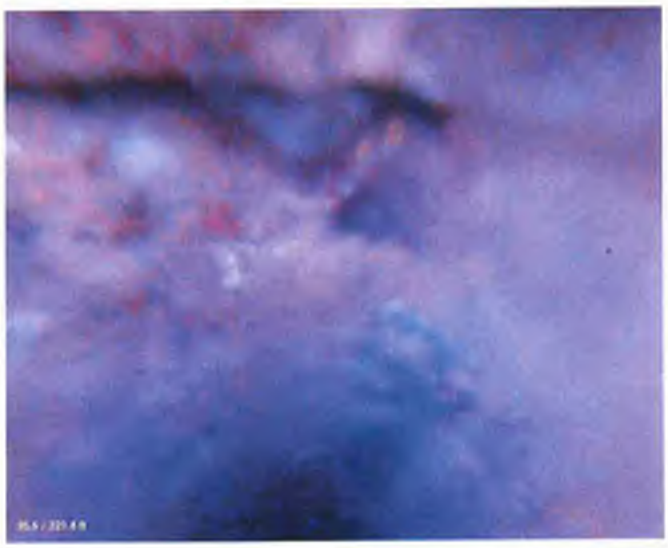


PACP Code:	SAP
Description:	Surface Aggregate Projecting
Distance (ft):	9.32
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	S02
Within 8" of Joint:	False
Remarks:	



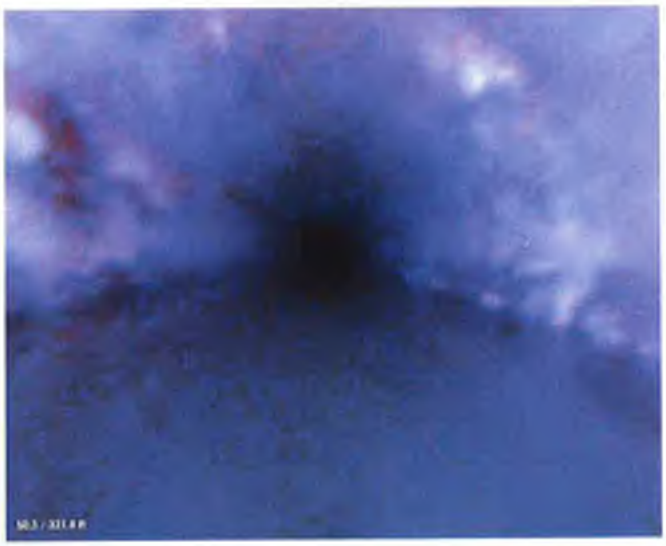
PACP Code:	FL
Description:	Fracture Longitudinal
Distance (ft):	23.36
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	28.27
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

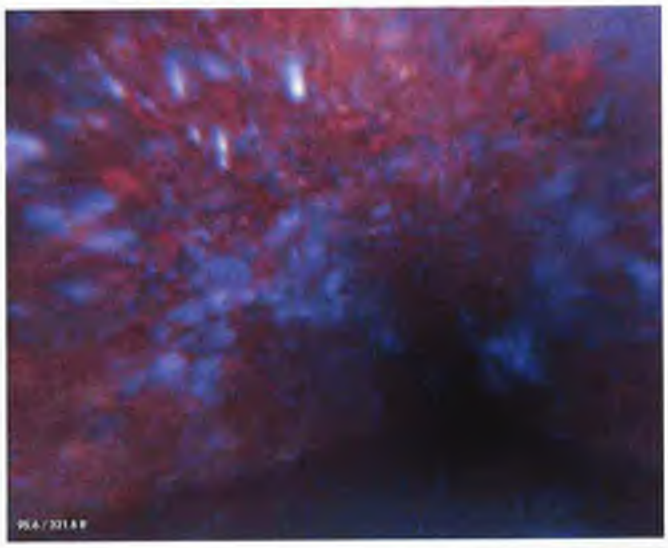


PACP Code:	HSV
Description:	Hole Soil Visible
Distance (ft):	35.6
Structural Grade:	5
O&M Grade:	NA
Clock Start/From:	12
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

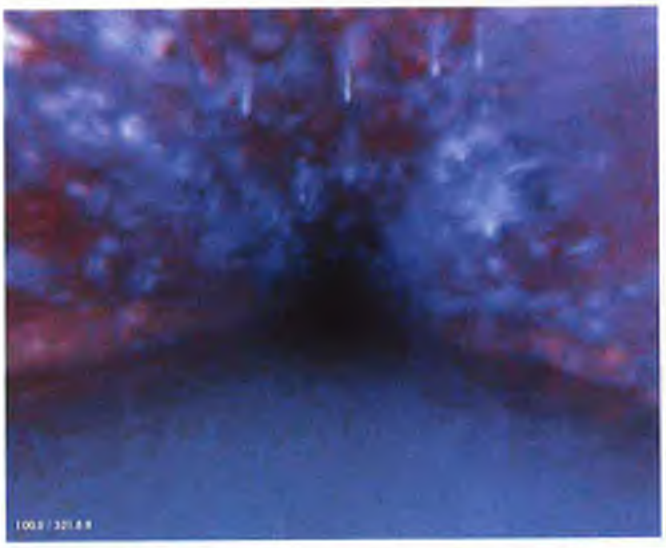
PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	41.54
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	11
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	MGP
Description:	General Photo
Distance (ft):	50.3
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

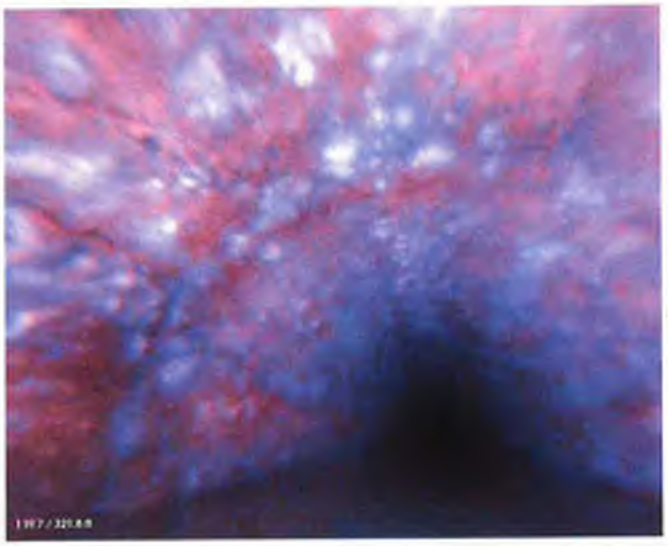


PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	95.59
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



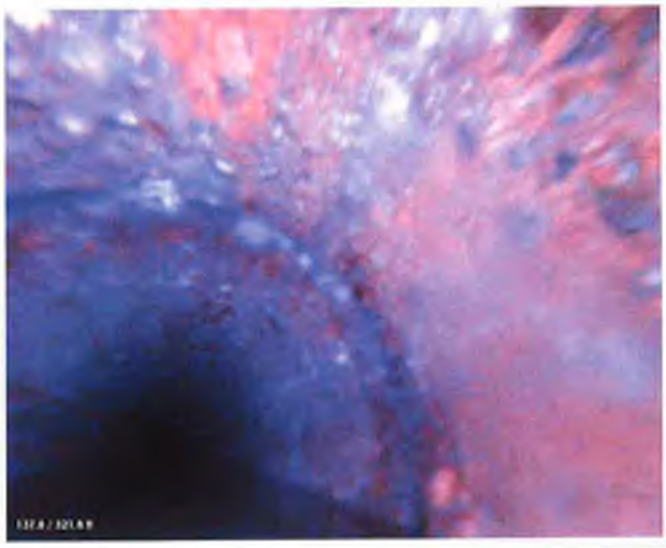
PACP Code:	MGP
Description:	General Photo
Distance (ft):	100.04
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	101.74
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	1
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

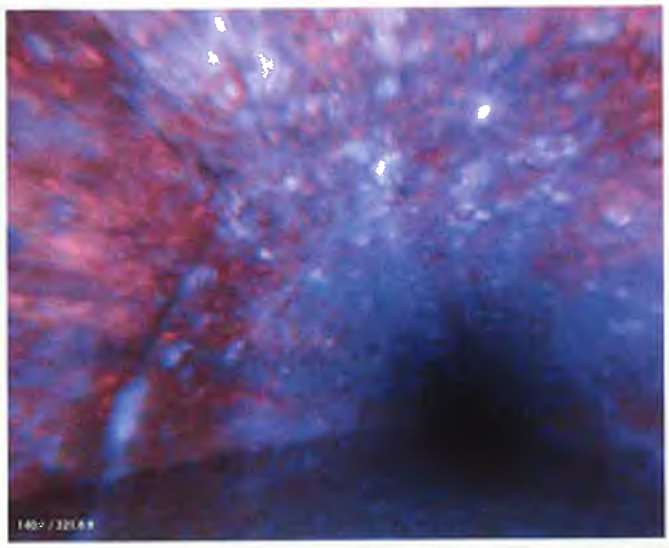


PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	119.72
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

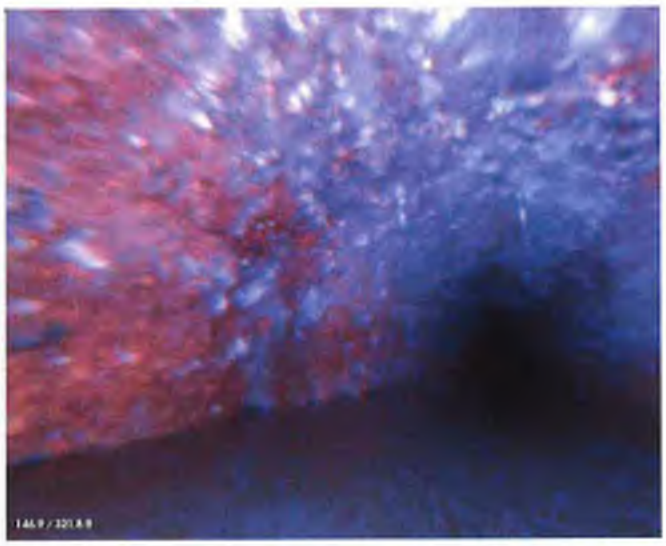
PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	134.9
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



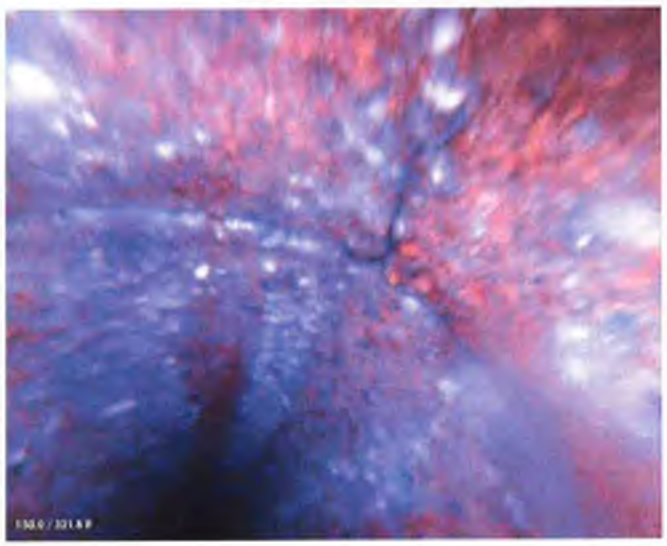
PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	137.81
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



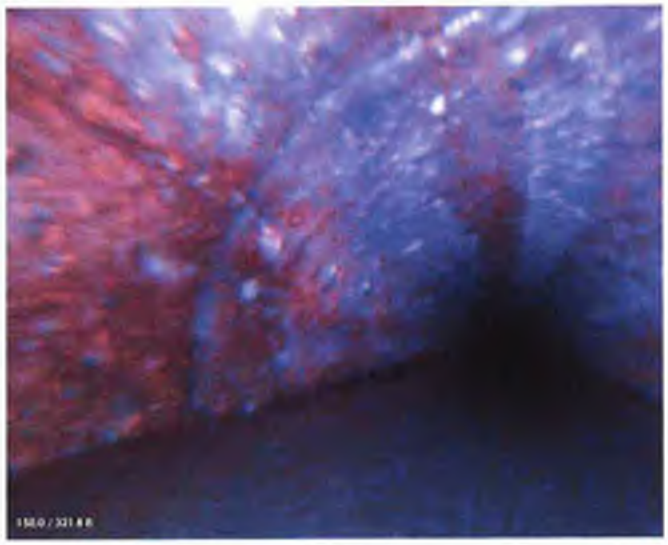
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	140.95
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	12
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



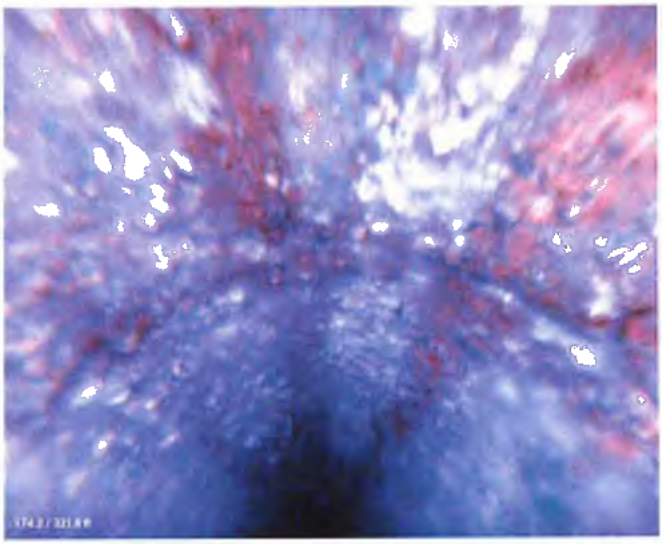
PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	146.93
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	9
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



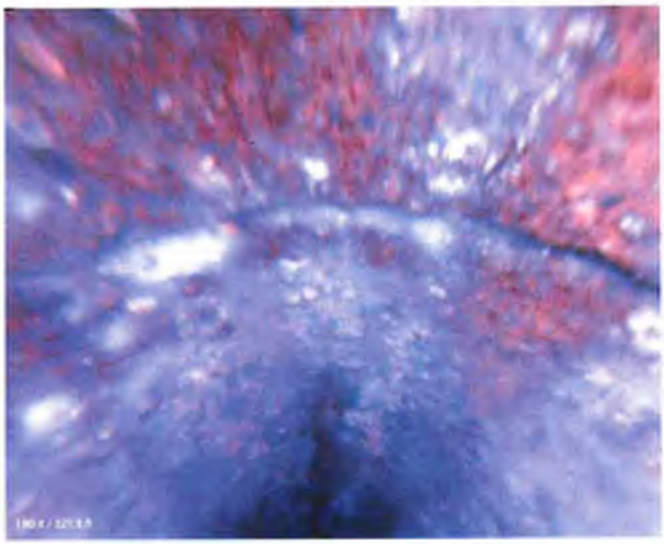
PACP Code:	FL
Description:	Fracture Longitudinal
Distance (ft):	150.02
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	1
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



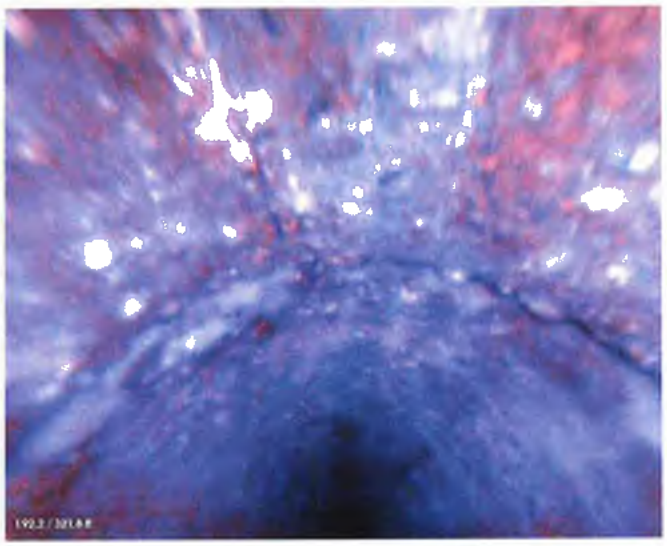
PACP Code:	FL
Description:	Fracture Longitudinal
Distance (ft):	150.02
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



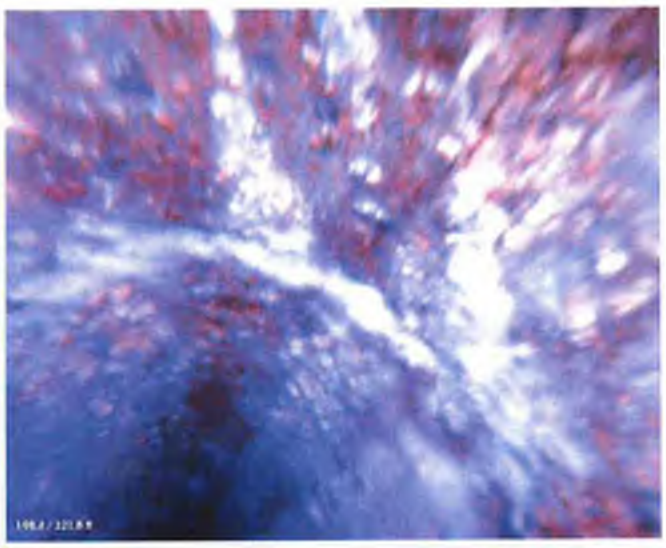
PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	174.16
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	12
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



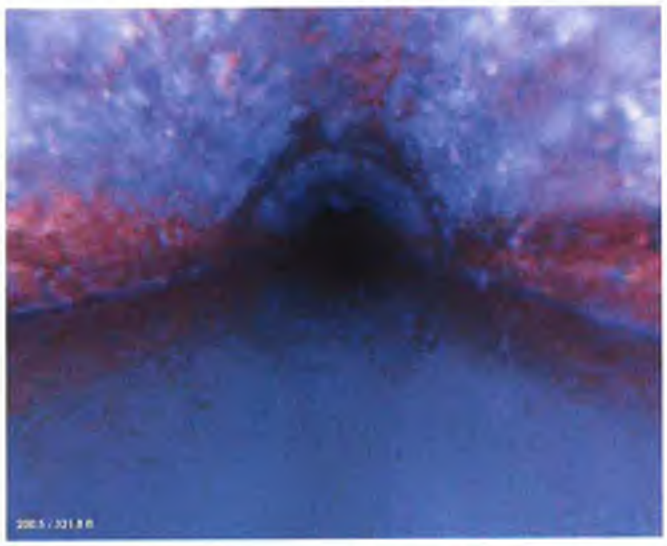
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	180.37
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	11
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



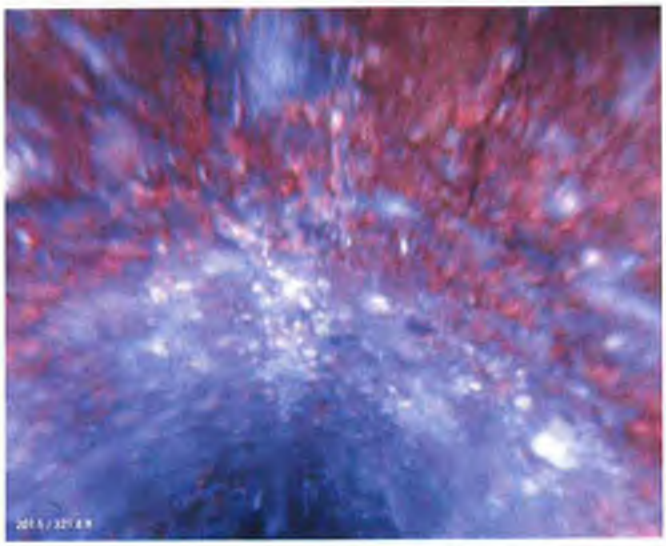
PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	192.24
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	1
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



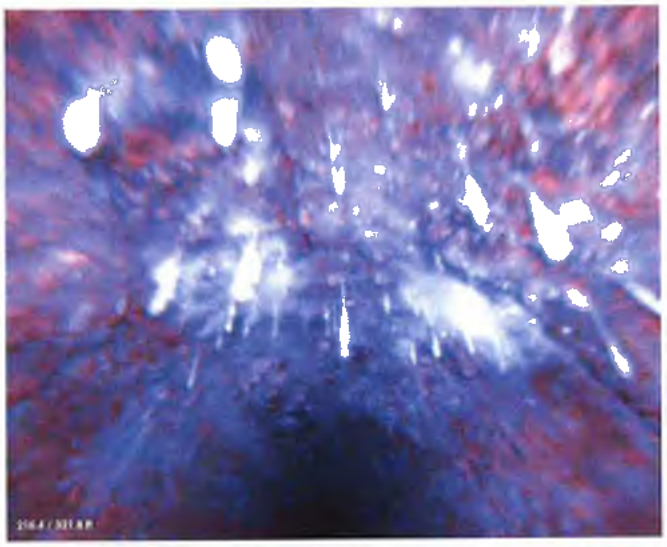
PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	198.36
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	1
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



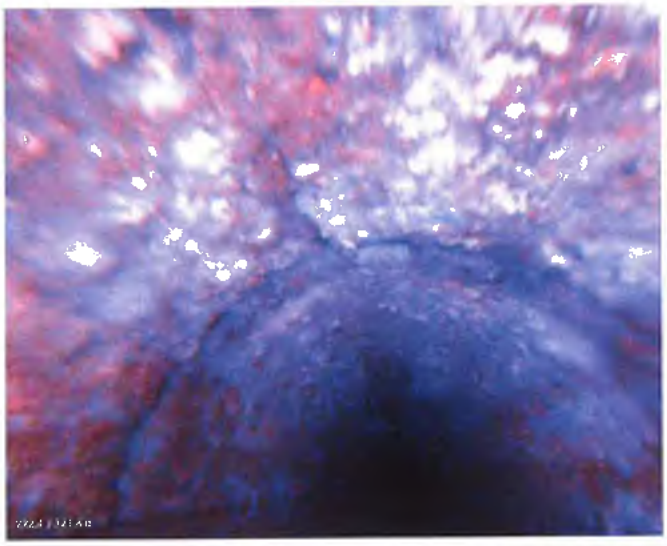
PACP Code:	MGP
Description:	General Photo
Distance (ft):	200.54
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



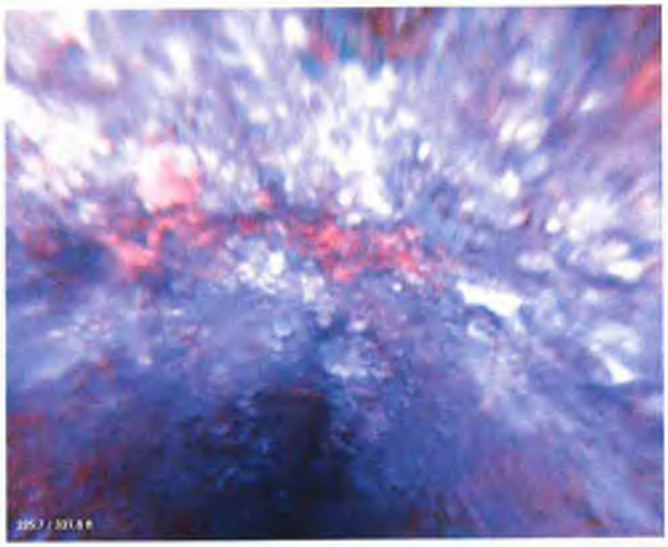
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	201.54
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	12
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



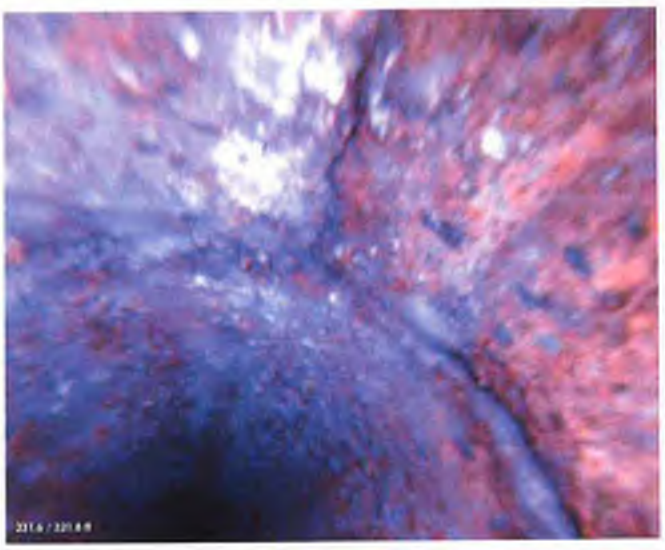
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	216.44
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	2
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



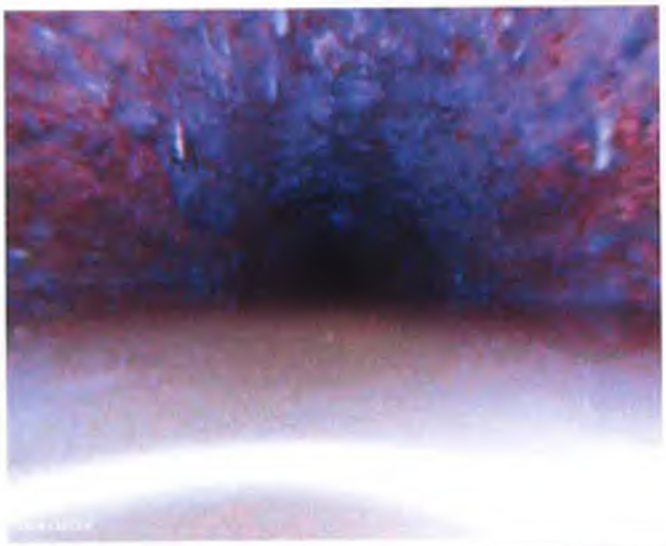
PACP Code:	FL
Description:	Fracture Longitudinal
Distance (ft):	222.38
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



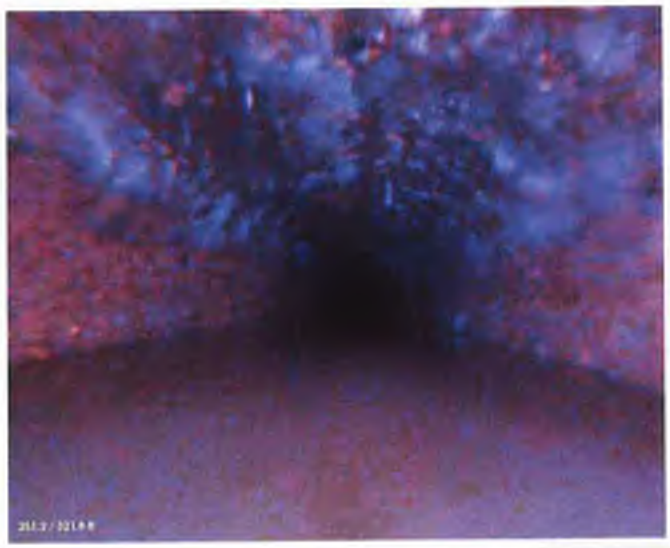
PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	225.67
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



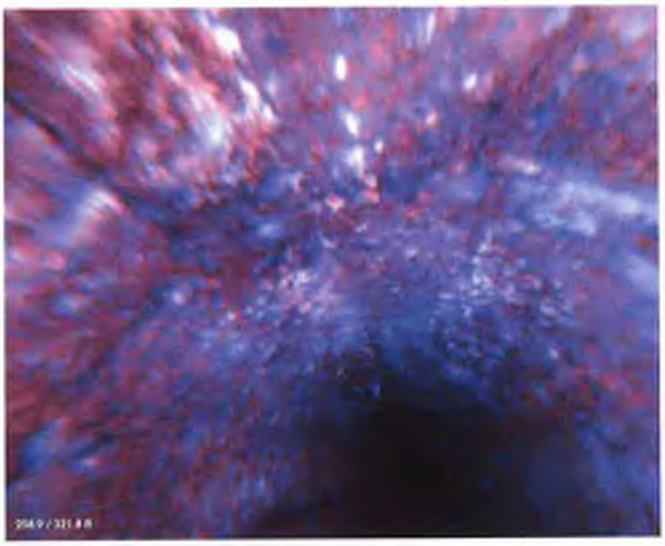
PACP Code:	FL
Description:	Fracture Longitudinal
Distance (ft):	231.62
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	1
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



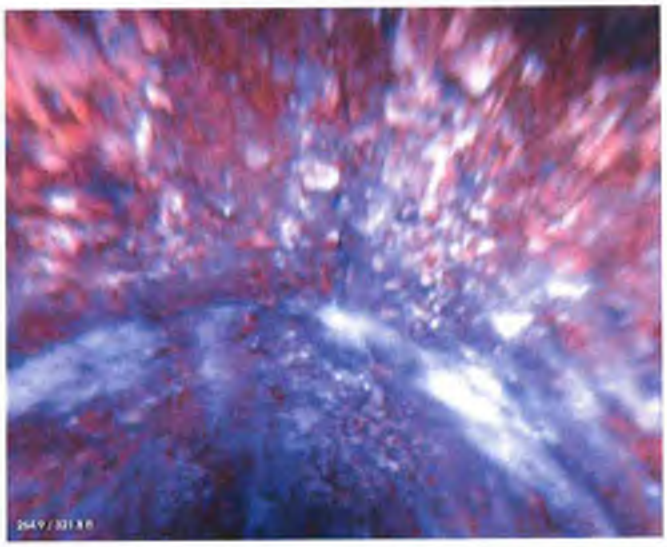
PACP Code:	MWL
Description:	Water Level
Distance (ft):	236.58
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MGP
Description:	General Photo
Distance (ft):	251.24
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

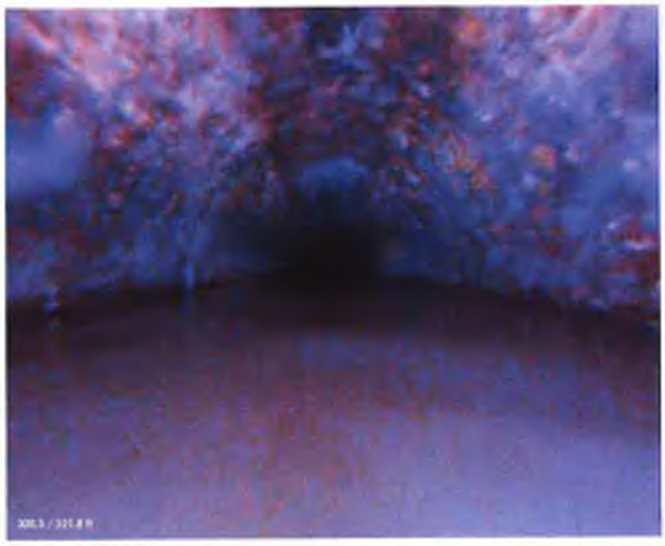


PACP Code:	FM
Description:	Fracture Multiple
Distance (ft):	258.87
Structural Grade:	4
O&M Grade:	NA
Clock Start/From:	10
Clock To:	12
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

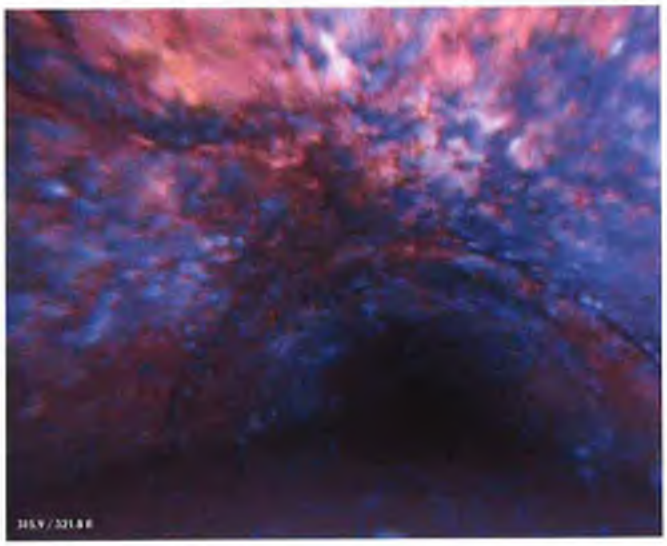


PACP Code:	FL
Description:	Fracture Longitudinal
Distance (ft):	264.9
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	12
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

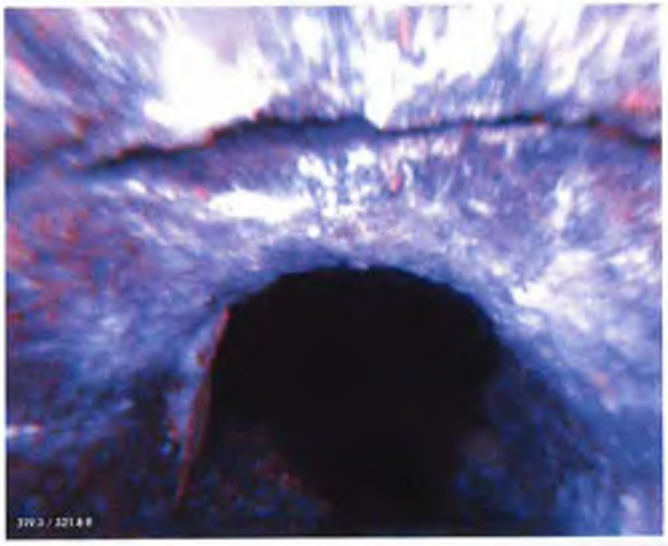
PACP Code:	FL
Description:	Fracture Longitudinal
Distance (ft):	274.01
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	MGP
Description:	General Photo
Distance (ft):	300.46
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	FL
Description:	Fracture Longitudinal
Distance (ft):	315.87
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	HSV
Description:	Hole Soil Visible
Distance (ft):	319.34
Structural Grade:	5
O&M Grade:	NA
Clock Start/From:	11
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	SAP
Description:	Surface Aggregate Projecting
Distance (ft):	321.78
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	F02
Within 8" of Joint:	False
Remarks:	

PACP Code:	AMH
Description:	Manhole
Distance (ft):	321.78
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	End of survey

07-4005 to 07-4004

CCTV Observation Report

Harris & Associates

Date: 11/13/15
Pipe Length
Customer: Veolia
Owner: City of Arvin
Surveyor:
Weather: Dry
Pre Clean:
Shape: Circular
Reach: 07-4005 to 07-4004

Street: N A St.
City: City of Arvin
Use:
Flow Control: Not Controlled
Dia/Height (in): 8 in
Material: Concrete Pipe
Survey Direction: Downstream
US Manhole: 07-4005
DS Manhole: 07-4004
Total Length Surveyed:

Position	Code	Observation	Video (sec)	Grade
0		Manhole		
0		Surface Spalling (continuous)		S3
12.9	TB	Tap Breaks In		
15.1	CC	Crack Circumfrential (J15-18)		S3
16.5	TF	Tap Factory		
31	TBA	Tap Breaks In Active		
62	CC	Crack Circumfrential @ Joints		S3
64	TF	Tap Factory		
78.5	TB	Tap Break In		
105.7	TBA	Tap Break In Active		
111.9	TFC	Tap Factory Capped		
114.1	TFC	Tap Factory Capped		
139.3	TB	Tap Break In		
158	EC	Fracture Circumfrencial	J158-161	S3
158	MWLS	Water Level Sag	J158-177	M3
164.4	TFC	Tap Factory Capped		
176.6	OBR	Obstacle Obstruction	J174-177	
200	CM	Crack Multiple		S3
200.5	TF	Tap Factory		
208	CC	Crack Circumfrential @ Joint		
208.4	TFA	Tap Factory Active		
209	MWLS	Water Level Sag	(J208-240)	
255	CC	Crack Circumfrential		
256.4	TF	Tap Factory		
257.7		Crack Circumfrential		
257.8	Hole	Hole		S5
258		Tap Factory		
282.7	TFC	Tap Factory Capped		
286	MWLS	Water Level Sag	(J286-303)	
291.1		~~Tap Factory~~ Tap Break-In Intruding		

J255 J265 SR

Open Trench Replacement 600ft

CCTV Observation Report

Harris & Associates

Date:	Owner:	Pre Clean:
Pipe Length	Surveyor:	Shape:
Customer:	Weather:	Reach:

Street:	Flow Control:	
City:	Dia/Height (in):	
Use:	Material:	Survey Direction:
US Manhole:	DS Manhole:	Total Length Surveyed:

Position	Code	Observation	Video (sec)	Grade
305.5	TF	Tap Factory		N/A
330	TBA	tap Break In Active		
335		Drop in Joint		
357.8	CL	Crack Circumferential		
360.2	TF	Tap Factory		
362.7	TF	tap Factory		

~~*Due to [illegible]~~

- Multiple sags in sewer line with many defects that need to be fixed
- more than 3 spot repairs

- Recommendation

- Open Trench Pipe Replacement 600 ft

Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/28/2009	Weather:	Dry		
Pipe Length (ft):	0	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12016	Surveyor:	JJC	PSR:	07-4004 to 07-4002
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	4th St.	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Light Highway	Tape/Media #:	NS23-714
Purpose:	Not Known	Dia/Height (in):	10
Use:	Sanitary	Material:	Concrete Pipe (non-reinforced)
Drain Area:		Lining:	
Category:			
Comment:	Reverse from 10/27.		
Location Details:		Direction of Survey:	Downstream

US MH: 07-4004 DS MH: 07-4002 Total Length Surveyed (ft): 124

07-4004

Camera Direction

Position	Code	Observation	Video (sec)	Grade
0	AMH	Manhole	5	NA
0	MWL	Water Level	13	NA
4.04	VC	Vermin Cockroach	29	M 1
6.86	MWL	Water Level	44	NA
15.34	SAP	Surface Aggregate Projecting	70	S 3
49.95	MGP	General Photo 15% water level	147	NA
55.52	CM	Crack Multiple	166	S 3
55.66	MMC	Material Change	175	NA
56.37	TF	Tap Factory	184	NA
58.16	MMC	Material Change	197	NA
70.65	OBR	Obstacle Rocks Clean	230	M 3
73.32	CC	Crack Circumferential Joint 73 – Joint 75.5	245	S 1
73.32	MMC	Material Change	254	NA
73.88	TF	Tap Factory Capped	264	NA
75.83	MMC	Material Change	277	NA
100.38	MGP	General Photo 15% WL	335	NA
105.79	CM	Crack Multiple Joint 106 Joint 108.5	354	S 3
105.79	MMC	Material Change	362	NA
106.66	TF	Tap Factory	372	NA
108.46	MMC	Material Change	385	NA
125.01	SAP	Surface Aggregate Projecting	426	S 3
125.01	MSA	Abandoned Survey	434	NA

Joint 55.5

Joint 58.1

SR 2.5'

SR 2.5'

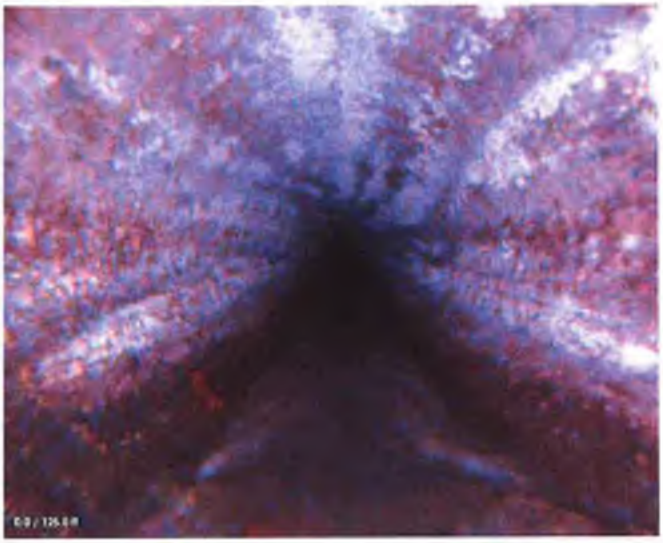
SR 2.5'

Manhole End → 446.2

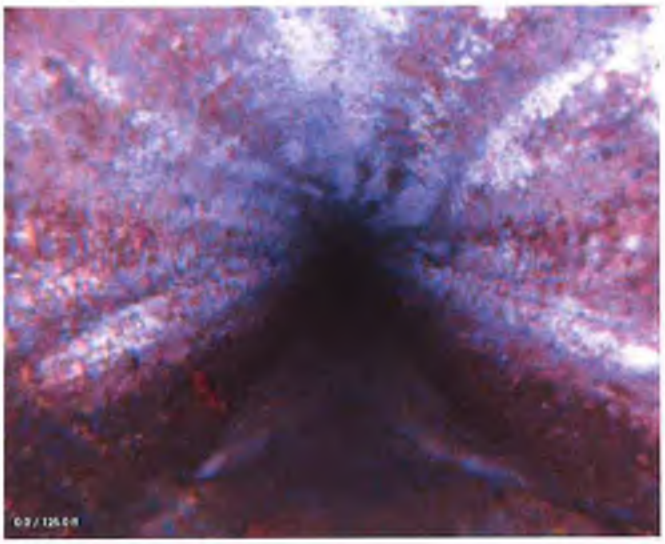
Cleaning

07-4002

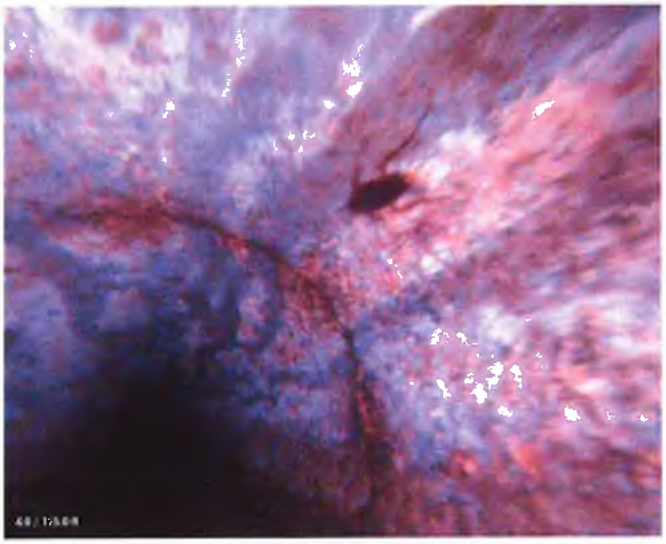
* more CCTV Survey – 2015



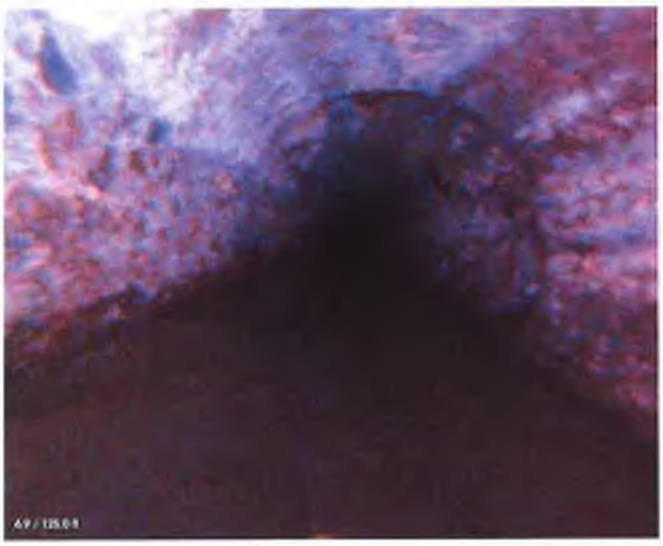
PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey



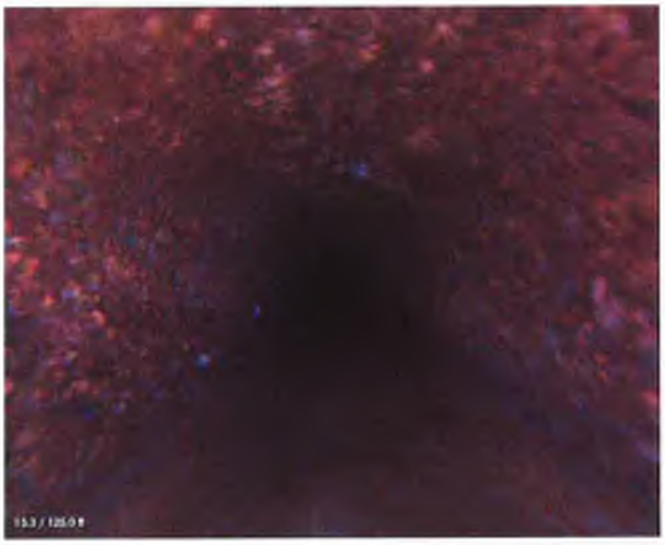
PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



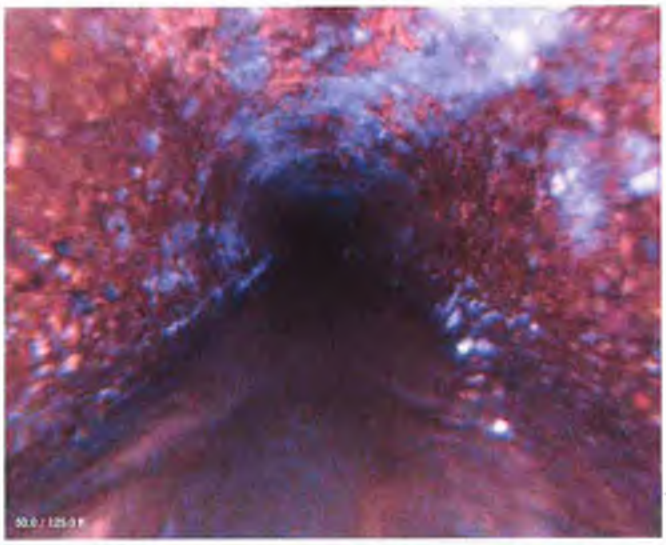
PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	4.04
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



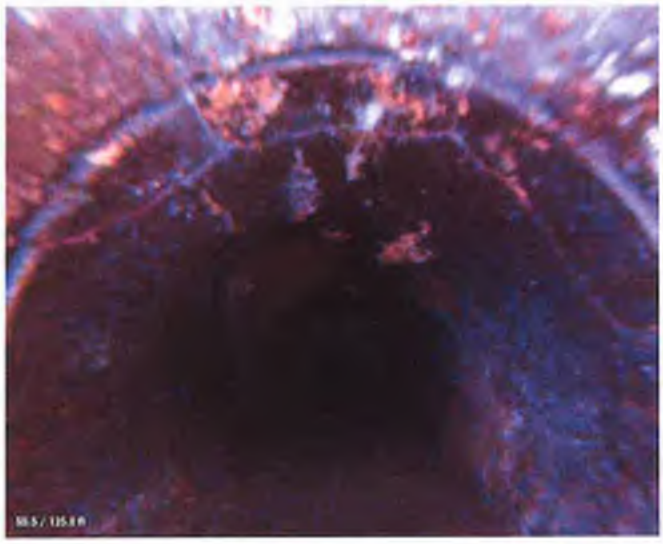
PACP Code:	MWL
Description:	Water Level
Distance (ft):	6.86
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



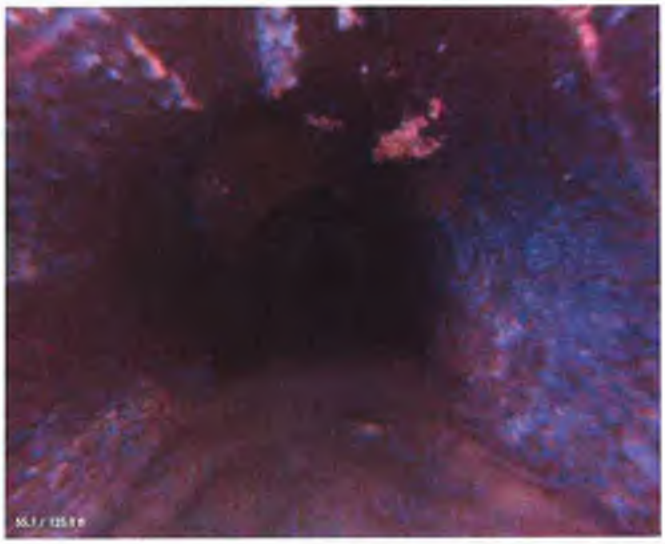
PACP Code:	SAP
Description:	Surface Aggregate Projecting
Distance (ft):	15.34
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	S01
Within 8" of Joint:	False
Remarks:	



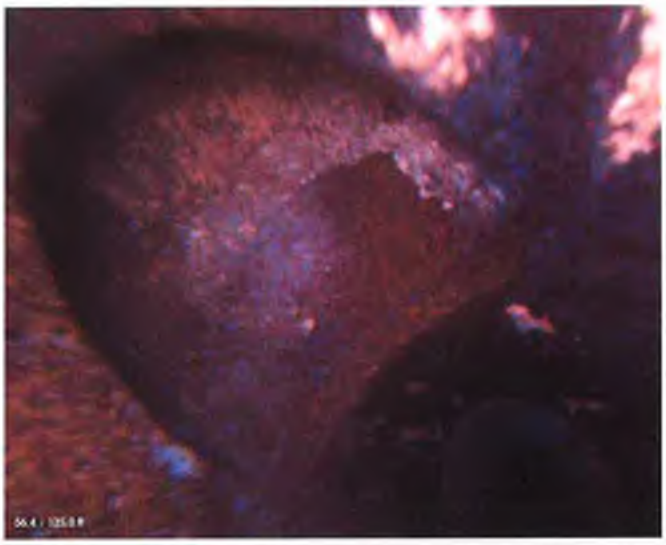
PACP Code:	MGP
Description:	General Photo
Distance (ft):	49.95
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



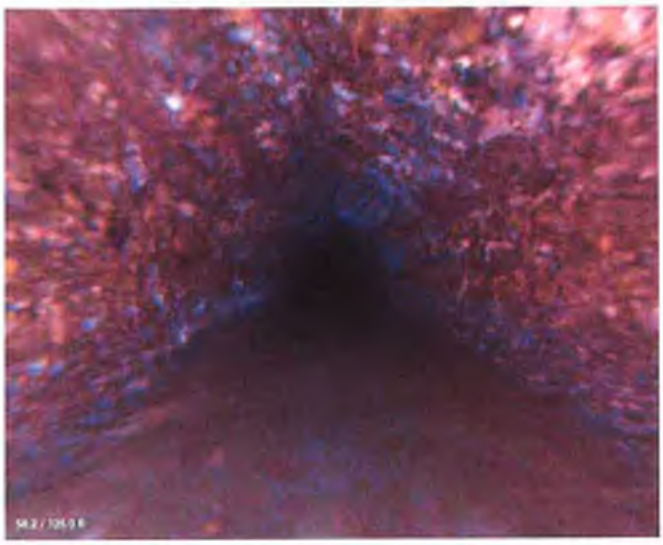
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	55.52
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



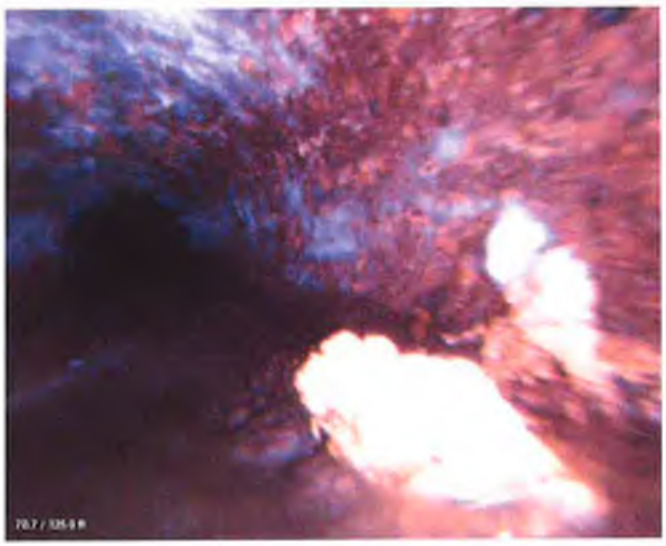
PACP Code:	MMC
Description:	Material Change
Distance (ft):	55.66
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified clay



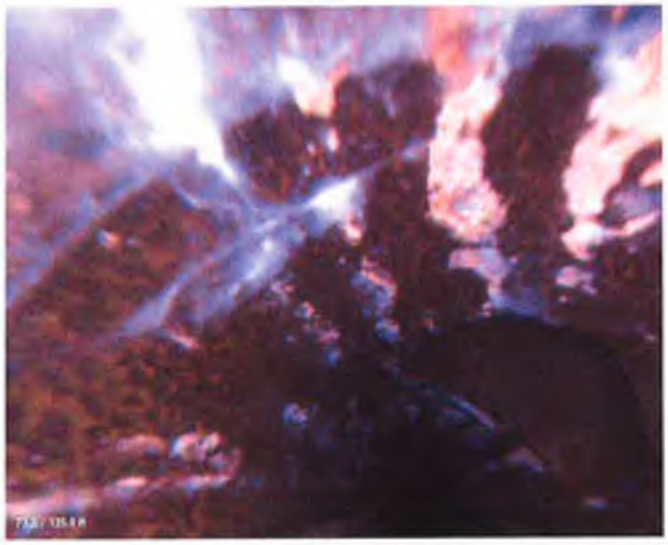
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	56.37
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



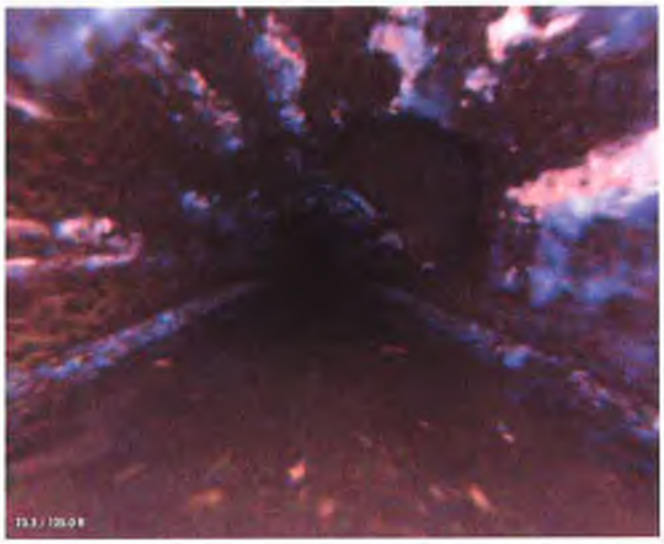
PACP Code:	MMC
Description:	Material Change
Distance (ft):	58.16
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Concrete



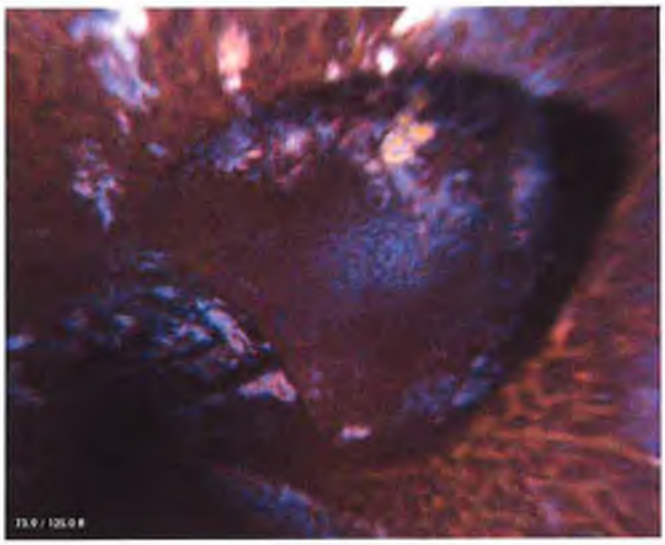
PACP Code:	OBR
Description:	Obstacle Rocks
Distance (ft):	70.65
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	5
Clock To:	6
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



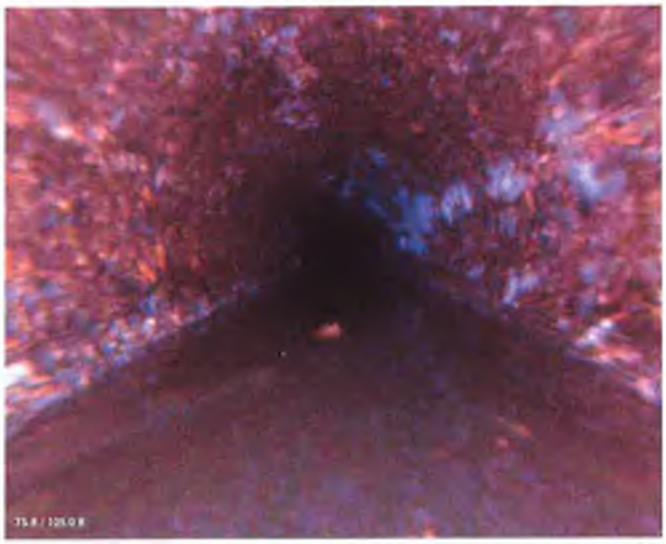
PACP Code:	CC
Description:	Crack Circumferential
Distance (ft):	73.32
Structural Grade:	1
O&M Grade:	NA
Clock Start/From:	9
Clock To:	12
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



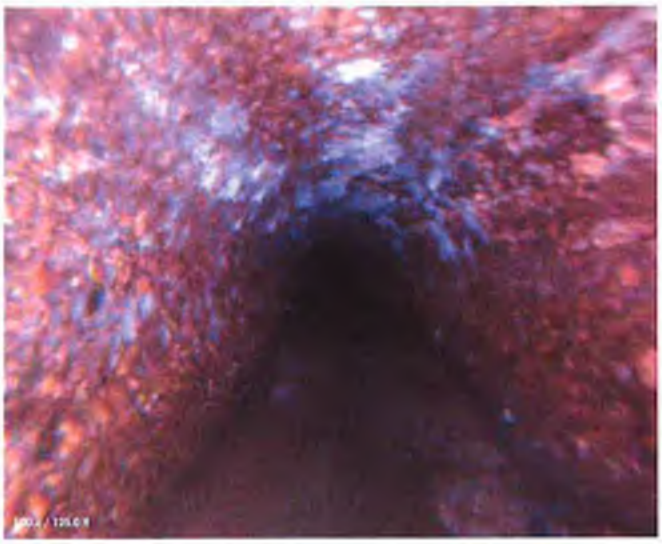
PACP Code:	MMC
Description:	Material Change
Distance (ft):	73.32
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified clay



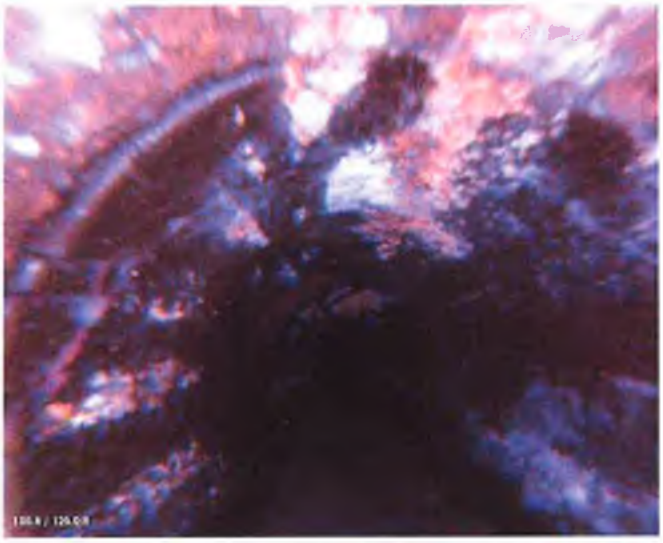
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	73.88
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



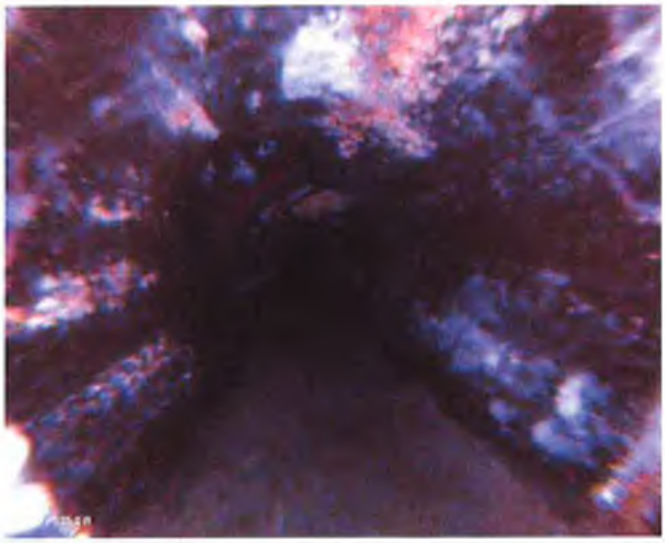
PACP Code:	MMC
Description:	Material Change
Distance (ft):	75.83
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Concrete



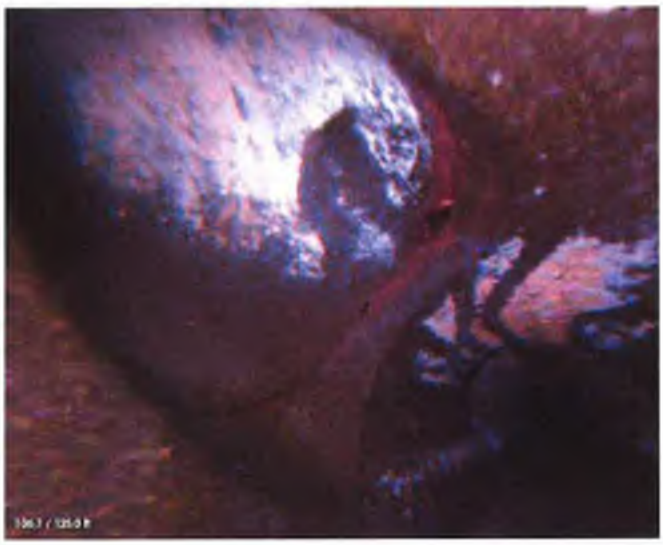
PACP Code:	MGP
Description:	General Photo
Distance (ft):	100.38
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



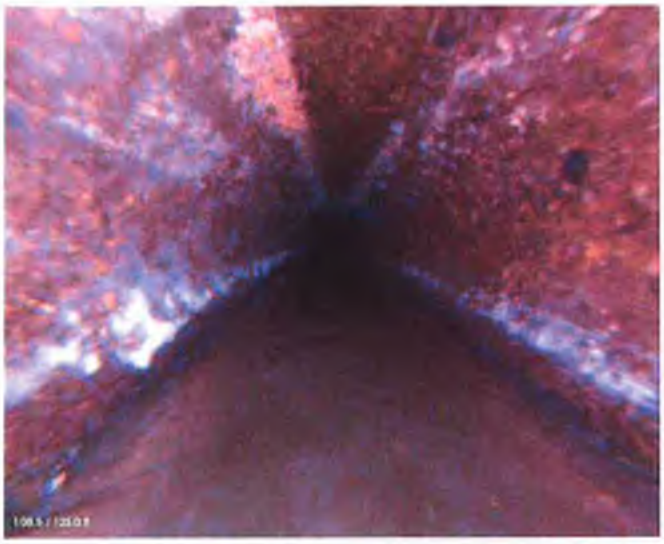
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	105.79
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	9
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



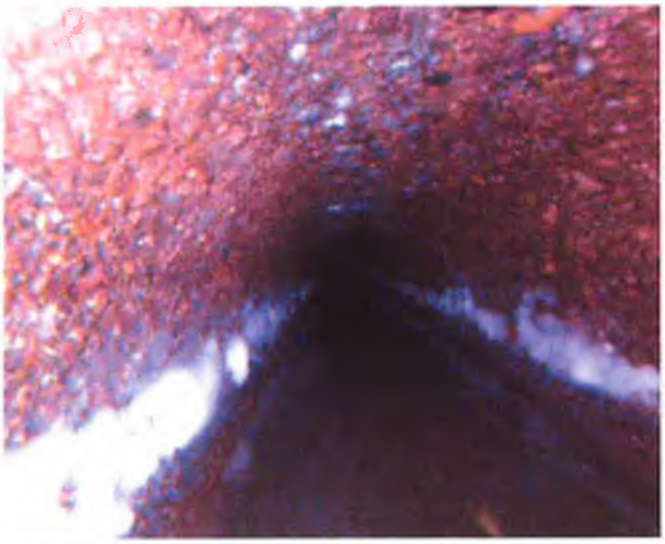
PACP Code:	MMC
Description:	Material Change
Distance (ft):	105.79
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified clay



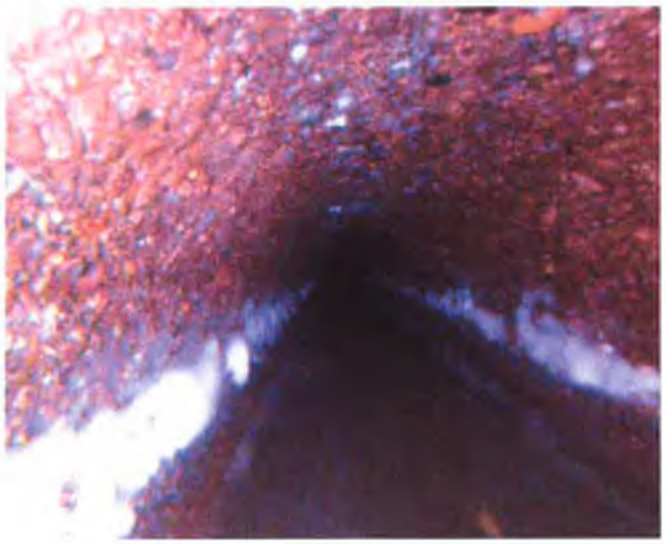
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	106.66
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MMC
Description:	Material Change
Distance (ft):	108.46
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Concrete



PACP Code:	SAP
Description:	Surface Aggregate Projecting
Distance (ft):	125.01
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	F01
Within 8" of Joint:	False
Remarks:	



PACP Code:	MSA
Description:	Abandoned Survey
Distance (ft):	125.01
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Poor mobility

Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/27/2009	Weather:	Dry		
Pipe Length (ft):	0	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12016	Surveyor:	JJC	PSR:	07-4003 to 07-4002
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

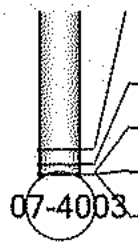
Street:	A Street Alley	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Alley	Tape/Media #:	NS6-822
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Reinforced Concrete Pipe
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Upstream

US MH: 07-4003 DS MH: 07-4002 Total Length Surveyed (ft): 161

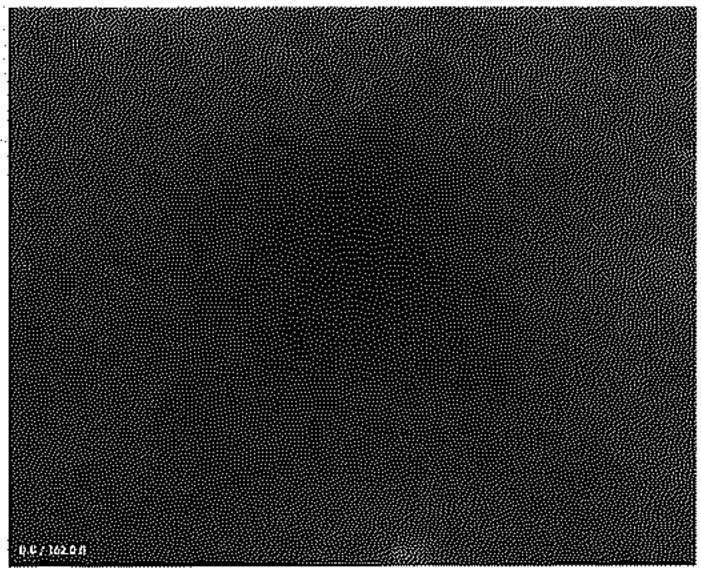
Recommendation

1. Clean → can de
2. CIPP

Position	Code	Observation		Video (sec)	Grade
0.51	AMH	Manhole		6	NA
0.51	MWL	Water Level	20%	14	NA
0.62	CM	Crack Multiple		23	S 3
0.68	SSS	Surface Spalling		33	S 2
0.72	SAV	Surface Aggregate Visible		43	S 3
4.82	VC	Vermin Cockroach		60	M 1
12.3	CM	Crack Multiple	10%	84	S 3
12.48	SSS	Surface Spalling		94	S 2
21.48	MMC	Material Change		123	NA
22.74	TFC	Tap Factory Capped	10%	133	NA
23.91	SSS	Surface Spalling		144	S 2
24.1	CM	Crack Multiple		155	S 3
24.1	CM	Crack Multiple		164	S 3
24.1	MMC	Material Change		174	NA
26.88	OBR	Obstacle Rocks		188	M 3
28.63	OBR	Obstacle Rocks		200	M 3
29.53	OBR	Obstacle Rocks		212	M 3
31.21	TBI	Tap Break-in Intruding	10%	225	M 3
33.04	SSS	Surface Spalling		237	S 2
35.96	CL	Crack Longitudinal		253	S 2
38.17	TBI	Tap Break-in Intruding	10%	267	M 3
38.93	OBR	Obstacle Rocks	10%	277	M 3
41.63	OBZ	Obstacle Other		292	M 3
48.11	CL	Crack Longitudinal		315	S 2
50.9	MGP	General Photo		331	NA
63.09	CL	Crack Longitudinal		364	S 2
63.13	CL	Crack Longitudinal		374	S 2
82.95	TBI	Tap Break-in Intruding		423	M 3
86.28	DSC	Deposits Settled Compacted		439	M 3
89.03	TB	Tap Break-in		454	NA
93.54	MMC	Material Change		472	NA
94.86	TFC	Tap Factory Capped	X	483	NA
97.49	TFC	Tap Factory Capped	X	498	NA
98.62	MMC	Material Change		509	NA
100.52	MGP	General Photo	Cobwebs	521	NA
118.24	TB	Tap Break-in		565	NA
125.91	DSF	Deposits Settled Fine		590	M 3
133.97	MGO	General Observation		616	NA
143.66	DAE	Deposits Attached Encrustation		644	M 3
158.93	MMC	Material Change		684	NA

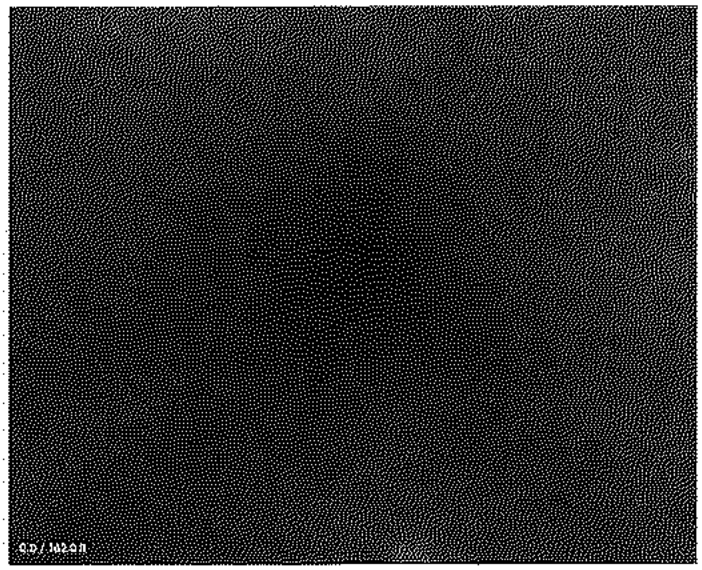


160.15	TF	Tap Factory	694	NA
161.05	DSF	Deposits Settled Fine	706	M 3
161.05	SAV	Surface Aggregate Visible	714	S 3
161.05	AEP	End of Pipe	722	NA



PACP Code: AMH
Description: Manhole

Distance (ft): 0.51
Structural Grade: NA
O&M Grade: NA
Clock Start/From:
Clock To:
1st Value:
2nd Value:
Continuous Index:
Within 8" of Joint: False
Remarks: Begin survey



PACP Code: MWL
Description: Water Level

Distance (ft): 0.51
Structural Grade: NA
O&M Grade: NA
Clock Start/From:
Clock To:
1st Value:
2nd Value:
Continuous Index:
Within 8" of Joint: False
Remarks:

PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	0.62
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	2
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	0.68
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

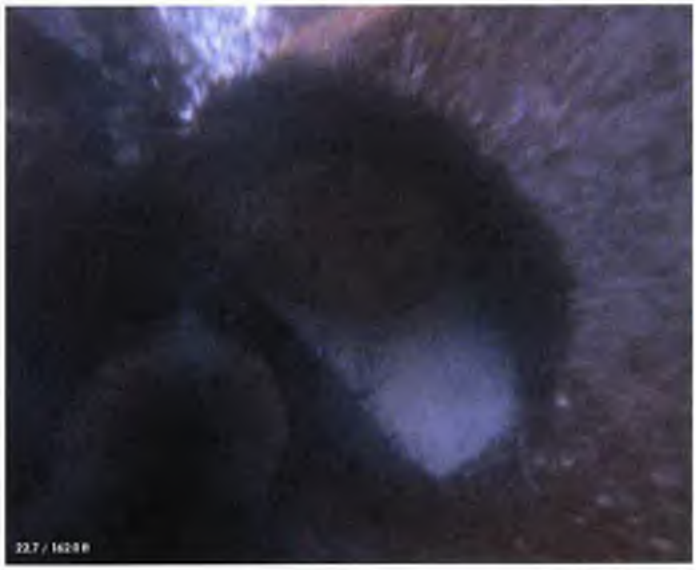
PACP Code:	SAV
Description:	Surface Aggregate Visible
Distance (ft):	0.72
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	S01
Within 8" of Joint:	False
Remarks:	

PACP Code:	VC
Description:	Vermin Cockroach
Distance (ft):	4.82
Structural Grade:	NA
O&M Grade:	1
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	12.3
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	2
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

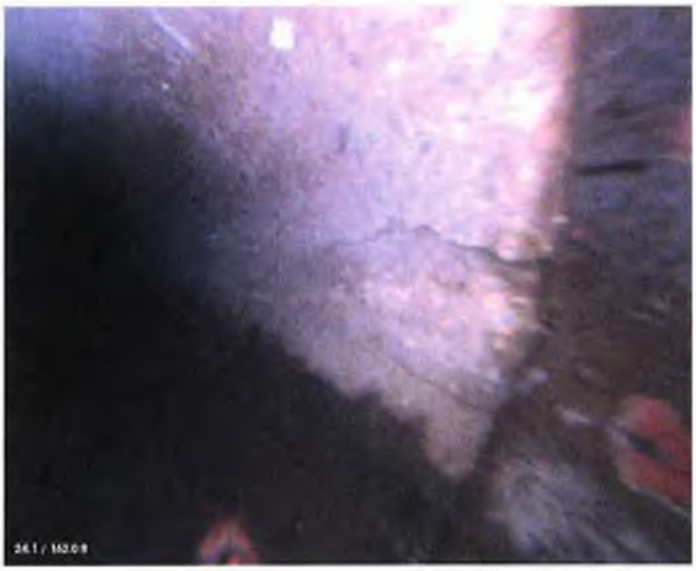
PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	12.48
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	2
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	MMC
Description:	Material Change
Distance (ft):	21.48
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified clay

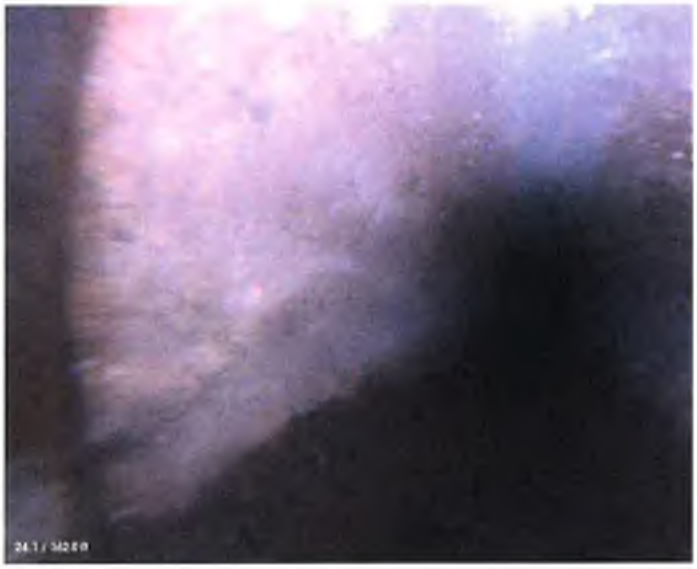


PACP Code:	TFC
Description:	Tap Factory Capped
Distance (ft):	22.74
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

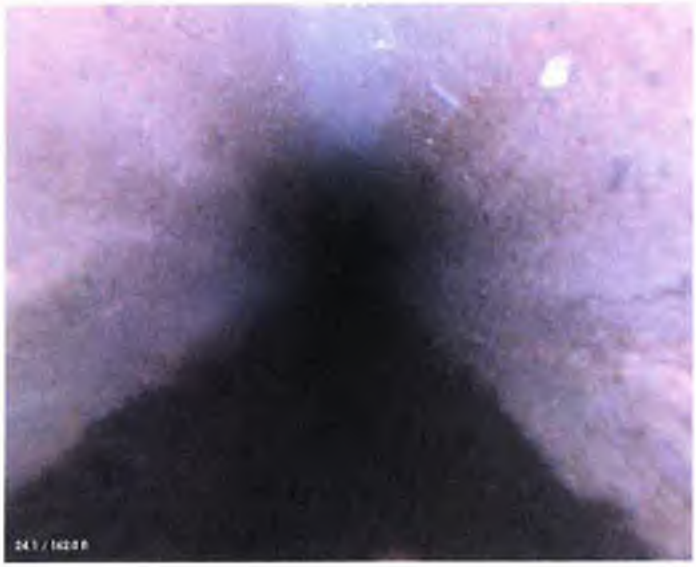
PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	23.91
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	3
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



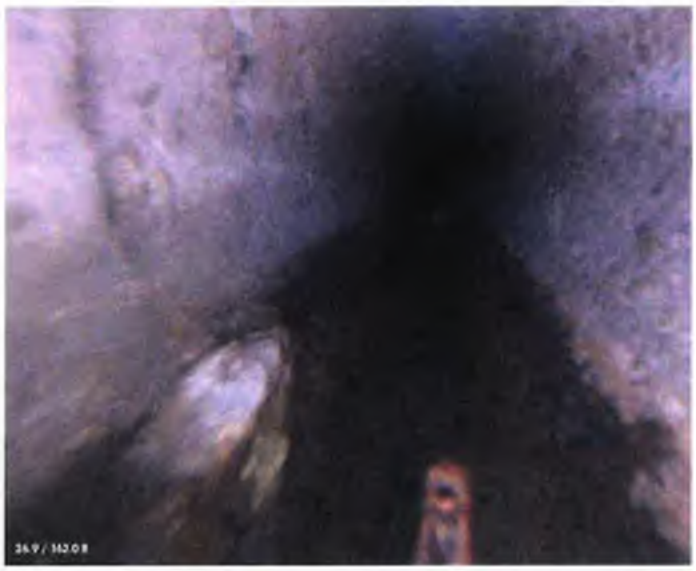
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	24.1
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	3
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	24.1
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	8
Clock To:	9
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	MMC
Description:	Material Change
Distance (ft):	24.1
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Concrete

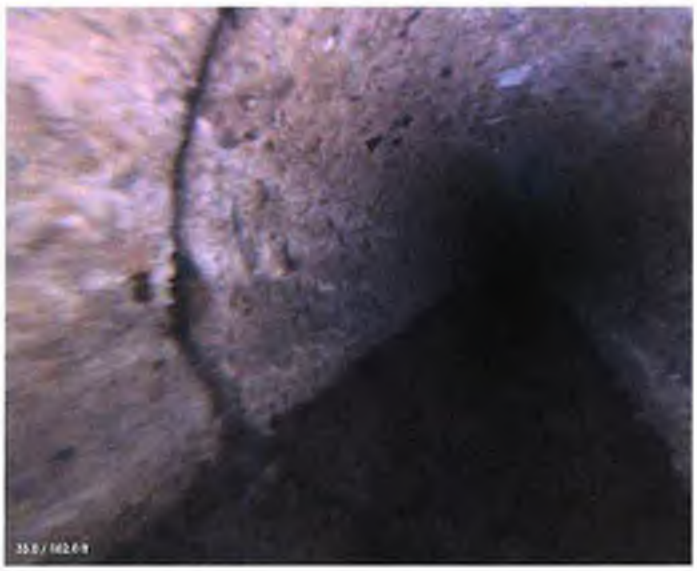


PACP Code:	OBR
Description:	Obstacle Rocks
Distance (ft):	26.88
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	7
Clock To:	8
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

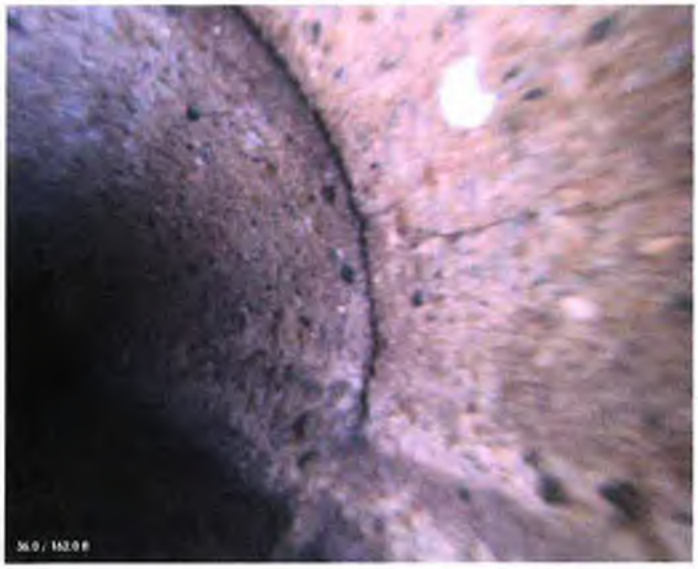
PACP Code:	OBR
Description:	Obstacle Rocks
Distance (ft):	28.63
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	6
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	OBR
Description:	Obstacle Rocks
Distance (ft):	29.53
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	7
Clock To:	8
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TBI
Description:	Tap Break-in Intruding
Distance (ft):	31.21
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	1
Clock To:	
1st Value:	4
2nd Value:	1
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	SSS
Description:	Surface Spalling
Distance (ft):	33.04
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	8
Clock To:	9
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	35.96
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	TBI
Description:	Tap Break-in Intruding
Distance (ft):	38.17
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	3
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

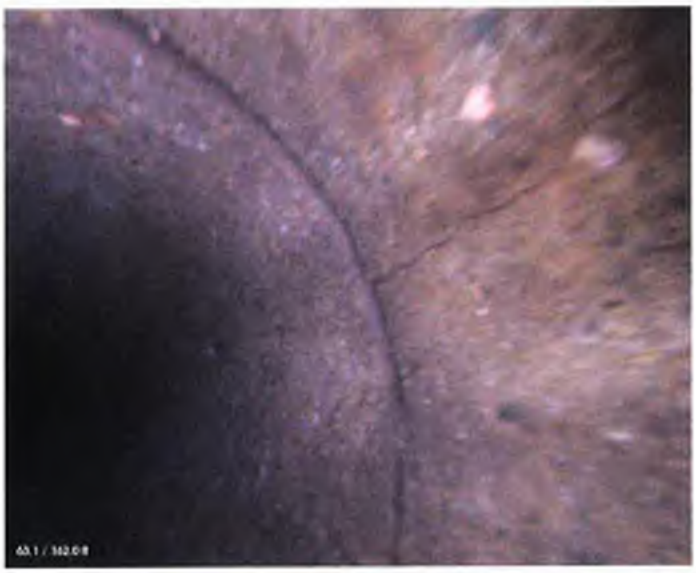
PACP Code:	OBR
Description:	Obstacle Rocks
Distance (ft):	38.93
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	7
Clock To:	8
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	OBZ
Description:	Obstacle Other
Distance (ft):	41.63
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	5
Clock To:	6
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Paper products

PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	48.11
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	1
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	50.9
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	63.09
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	63.13
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

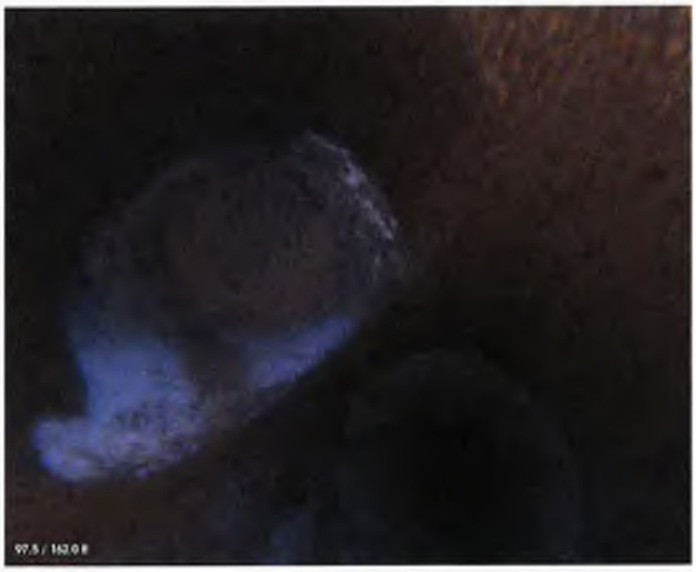
PACP Code:	TBI
Description:	Tap Break-in Intruding
Distance (ft):	82.95
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	1
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	DSC
Description:	Deposits Settled Compacted
Distance (ft):	86.28
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	6
Clock To:	7
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Paper products

PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	89.03
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MMC
Description:	Material Change
Distance (ft):	93.54
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified Clay

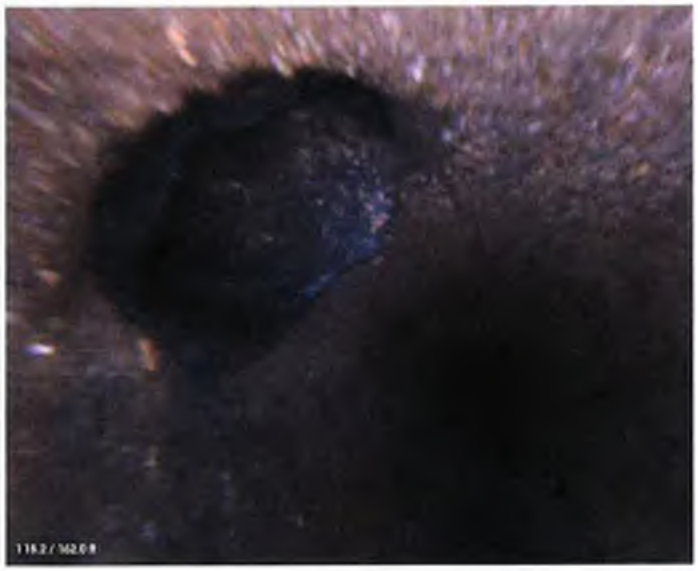
PACP Code:	TFC
Description:	Tap Factory Capped
Distance (ft):	94.86
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TFC
Description:	Tap Factory Capped
Distance (ft):	97.49
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MMC
Description:	Material Change
Distance (ft):	98.62
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Concrete

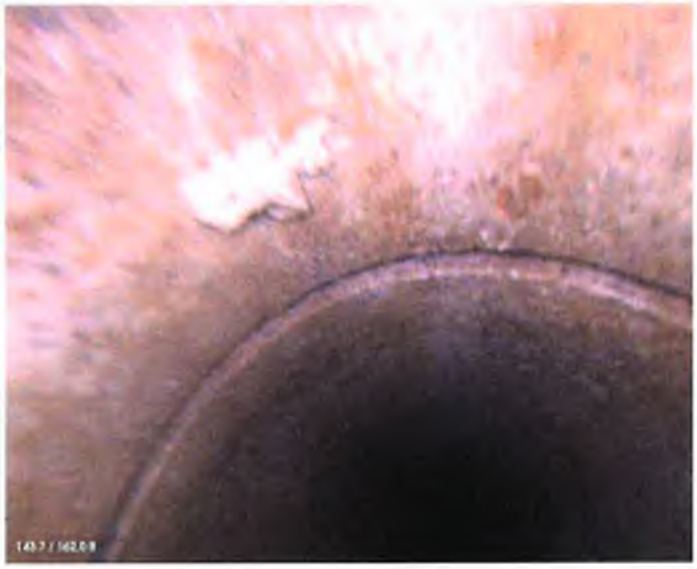
PACP Code:	MGP
Description:	General Photo
Distance (ft):	100.52
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	118.24
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	DSF
Description:	Deposits Settled Fine
Distance (ft):	125.91
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	5
Clock To:	7
1st Value:	
2nd Value:	
Continuous Index:	S02
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGO
Description:	General Observation
Distance (ft):	133.97
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Cobwebs



PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	143.66
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	11
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MMC
Description:	Material Change
Distance (ft):	158.93
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified clay

PACP Code:	TF
Description:	Tap Factory
Distance (ft):	160.15
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	12
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	DSF
Description:	Deposits Settled Fine
Distance (ft):	161.05
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	5
Clock To:	7
1st Value:	
2nd Value:	
Continuous Index:	F02
Within 8" of Joint:	False
Remarks:	

PACP Code:	SAV
Description:	Surface Aggregate Visible
Distance (ft):	161.05
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	F01
Within 8" of Joint:	False
Remarks:	

PACP Code:	AEP
Description:	End of Pipe
Distance (ft):	161.05
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	End of survey

Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/27/2009	Weather:	Dry		
Pipe Length (ft):	216	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12016	Surveyor:	JJC	PSR:	07-4002 to 07-4001
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	A Street Alley	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Alley	Tape/Media #:	NS11-1194
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Concrete Pipe (non-reinforced)
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Downstream

US MH: 07-4002 DS MH: 07-4001 Total Length Surveyed (ft): 216

. open trench replacement
216 ft

Joint @ 3ft

07-4002

Camera Direction

Position	Code	Observation	Video (sec)	Grade
0	AMH	Manhole	5	NA
0	MWL	Water Level (WL = 15%)	13	NA
0	SAP	Surface Aggregate Projecting continuous	21	S 3
2.09	CM	Crack Multiple	34	S 3
8.76	TBI	Tap Break-in Intruding	57	M 3
13.98	CM	Crack Multiple	78	S 3
14.08	MMC	Material Change	86	NA
14.7	TF	Tap Factory	96	NA
16.94	MMC	Material Change WL = 10 - 15%	110	NA
20.65	TBI	Tap Break-in Intruding *cracked	126	M 3
28.85	FM	Fracture Multiple	153	S 4
37.95	CM	Crack Multiple J35 - J38	180	S 3
50.7	MGP	General Photo	215	NA
56.03	CM	Crack Multiple	234	S 3
56.77	TF	Tap Factory	244	NA
68.64	MWL	Water Level (WL = 10%)	278	NA
70.69	CM	Crack Multiple J68 - J71	290	S 3
71.5	TF	Tap Factory	300	NA
73.61	CM	Crack Multiple	314	S 3
79.65	CL	Crack Longitudinal	335	S 2
100.35	MGP	General Photo	386	NA
103.77	CM	Crack Multiple	401	S 3
103.92	MMC	Material Change	409	NA
104.49	TF	Tap Factory	419	NA
106.41	MMC	Material Change	432	NA
108.53	TB	Tap Break-in	444	NA
121.73	CL	Crack Longitudinal	480	S 2
127.8	CS	Crack Spiral	502	S 2
137.59	TBA	Tap Break-in Active	531	NA
152.08	CM	Crack Multiple	570	S 3
152.13	MMC	Material Change J152 not in good condition	580	NA
152.78	TF	Tap Factory	589	NA
154.75	MMC	Material Change	603	NA
158.11	TBA	Tap Break-in Active	618	NA
182.05	MMC	Material Change J182 - 185	676	NA
182.79	TF	Tap Factory	686	NA
184.67	MMC	Material Change	699	NA
200.08	MGP	General Photo	738	NA
214.6	SAP	Surface Aggregate Projecting	775	S 3
216.06	AMH	Manhole	786	NA

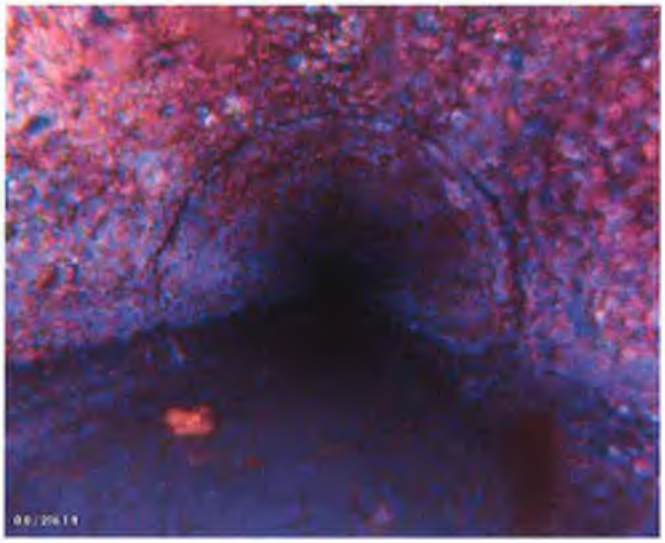
Spot Repair J26-38

Recommendations

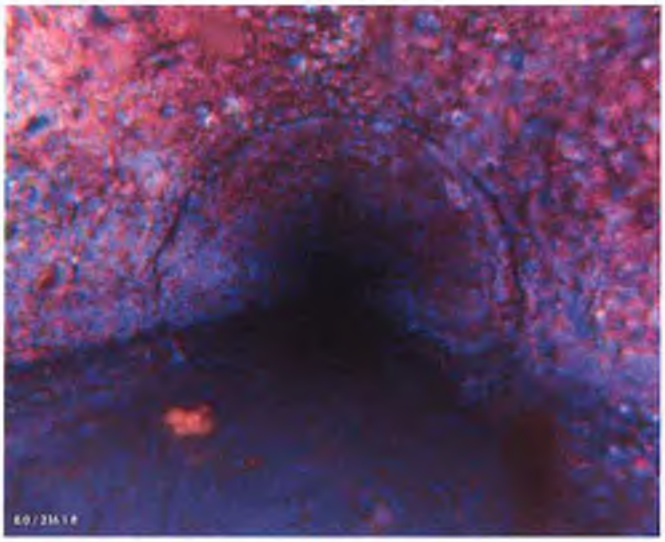
~~• Spot Repair from (J26-J38) (12ft)~~

~~• CIPP Lining of 216 ft~~

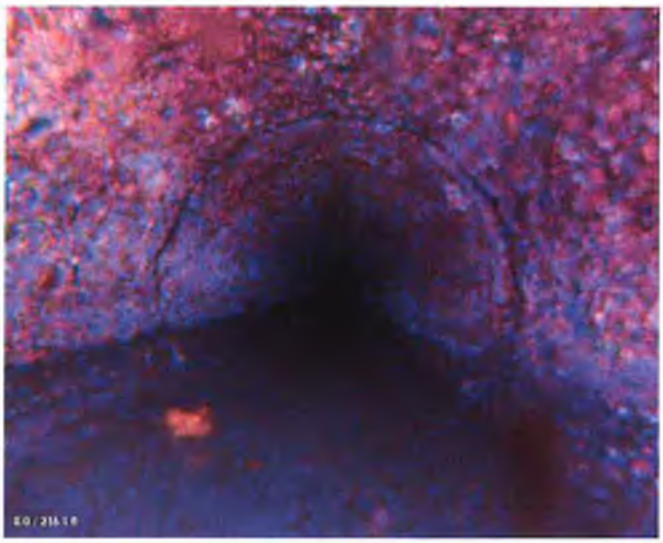
• Open Trench Replacement 216



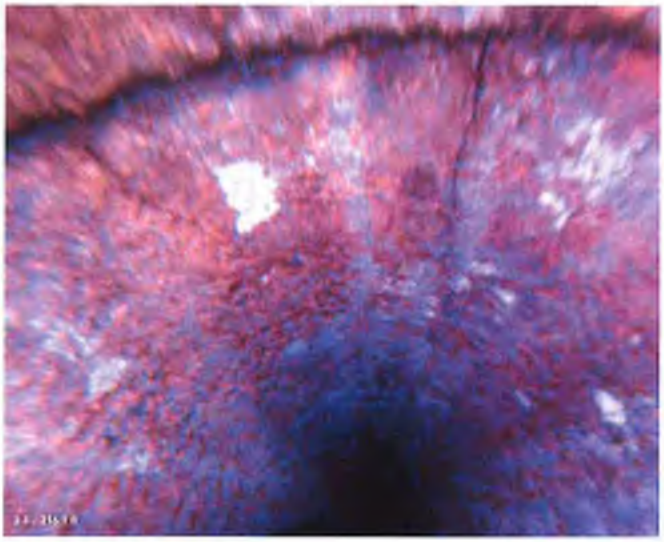
PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey



PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

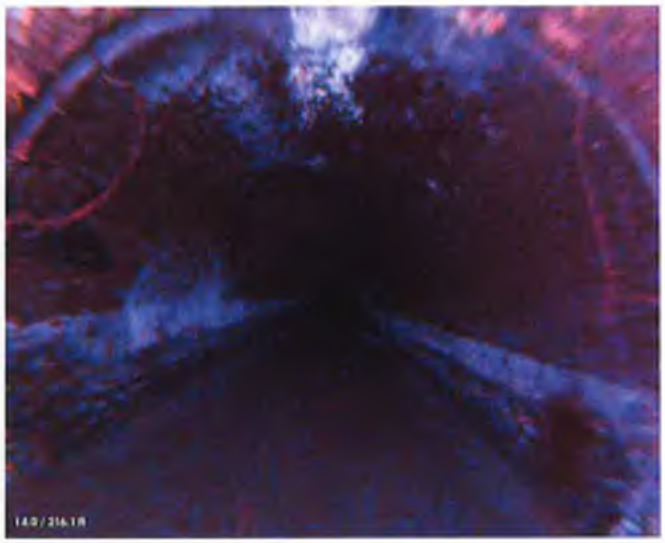


PACP Code:	SAP
Description:	Surface Aggregate Projecting
Distance (ft):	0
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	S01
Within 8" of Joint:	False
Remarks:	



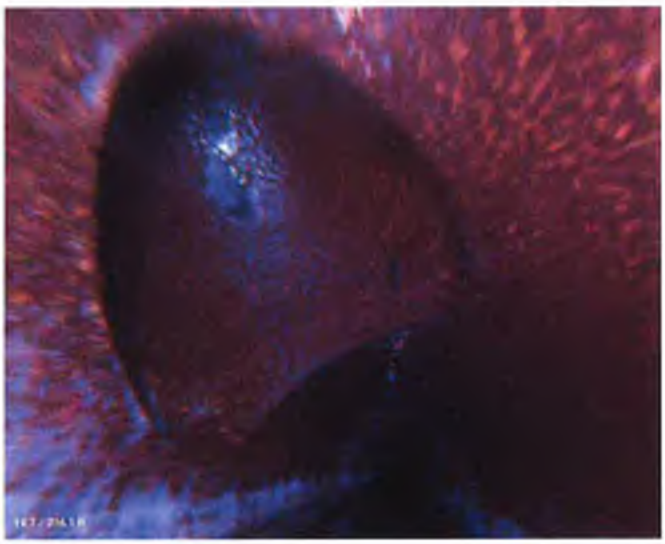
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	2.09
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	11
Clock To:	12
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

PACP Code:	TBI
Description:	Tap Break-in Intruding
Distance (ft):	8.76
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	12
Clock To:	
1st Value:	4
2nd Value:	1
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

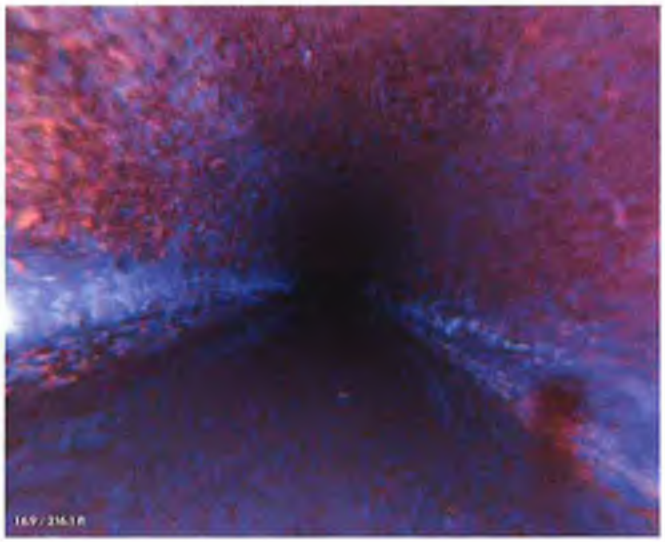


PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	13.98
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	

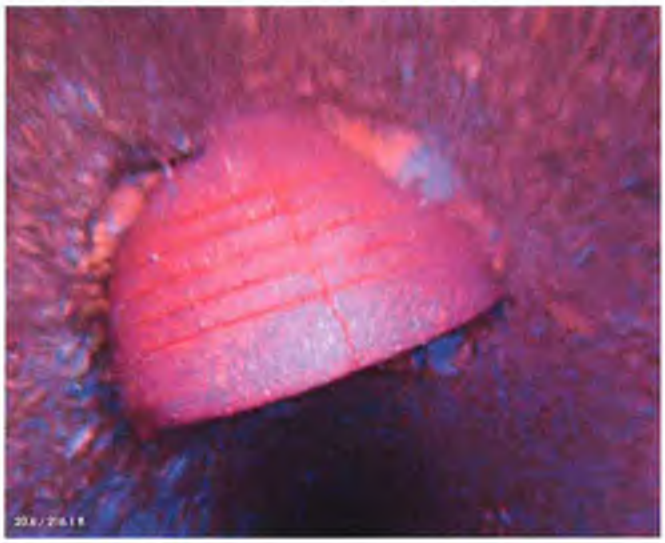
PACP Code:	MMC
Description:	Material Change
Distance (ft):	14.08
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified clay



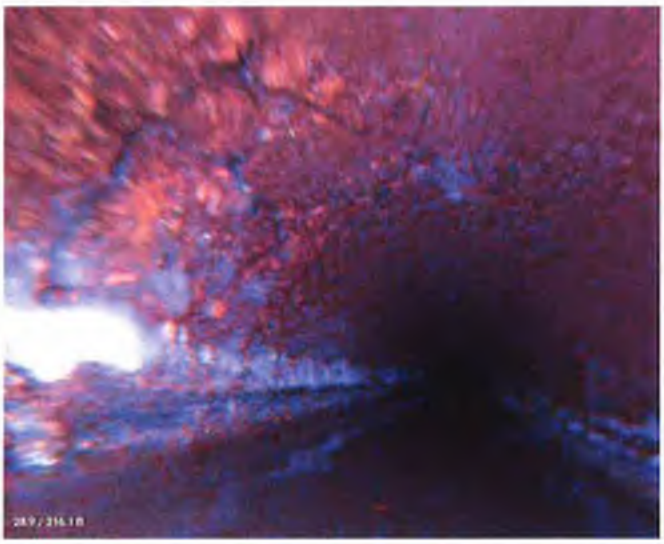
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	14.7
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



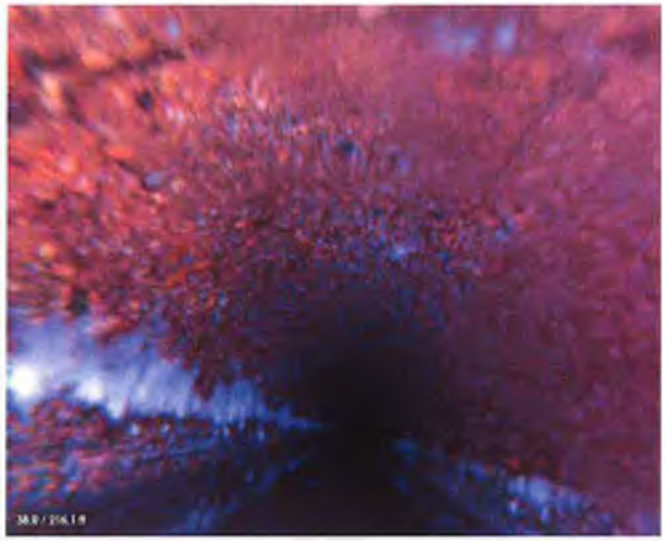
PACP Code:	MMC
Description:	Material Change
Distance (ft):	16.94
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Concrete



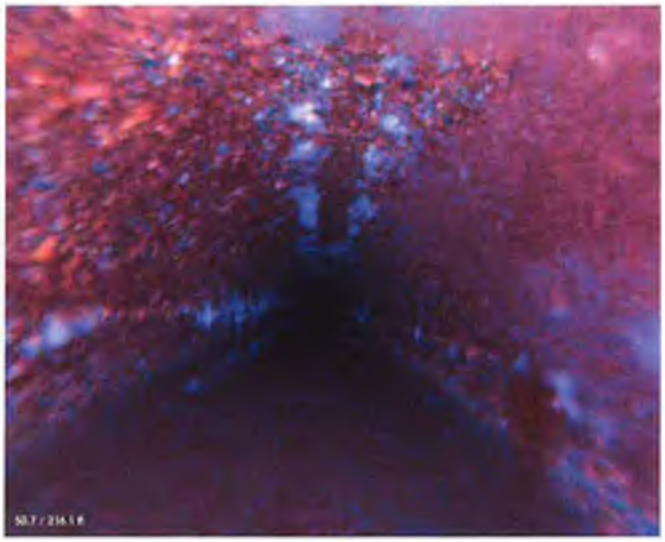
PACP Code:	TBI
Description:	Tap Break-in Intruding
Distance (ft):	20.65
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	11
Clock To:	
1st Value:	4
2nd Value:	2
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Cracked



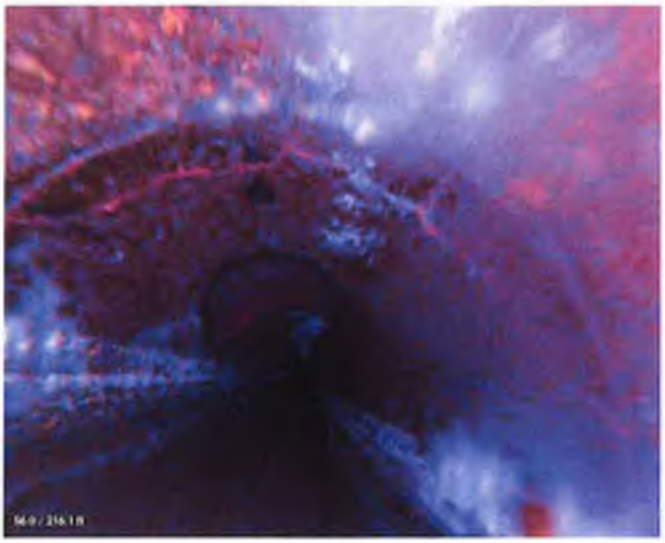
PACP Code:	FM
Description:	Fracture Multiple
Distance (ft):	28.85
Structural Grade:	4
O&M Grade:	NA
Clock Start/From:	9
Clock To:	11
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



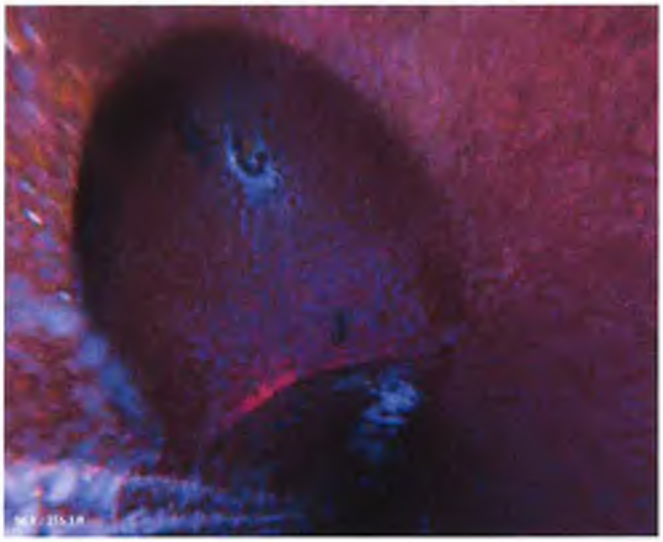
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	37.95
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



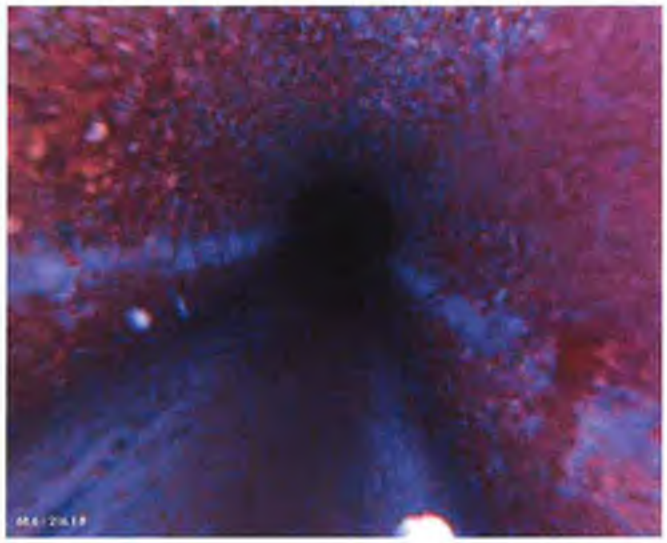
PACP Code:	MGP
Description:	General Photo
Distance (ft):	50.7
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



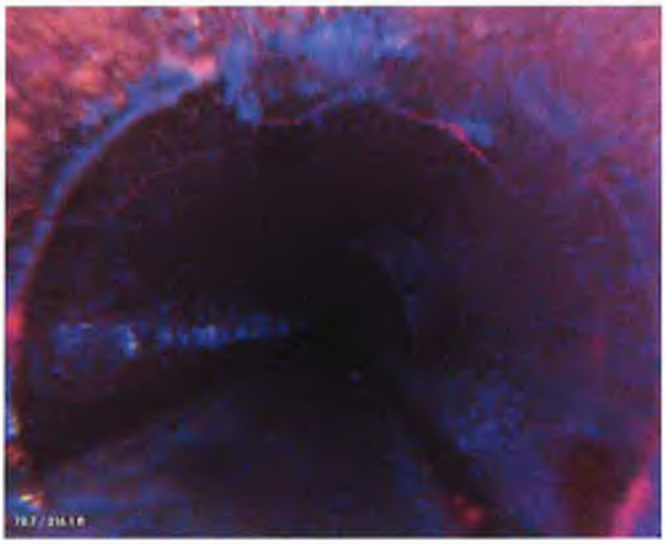
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	56.03
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



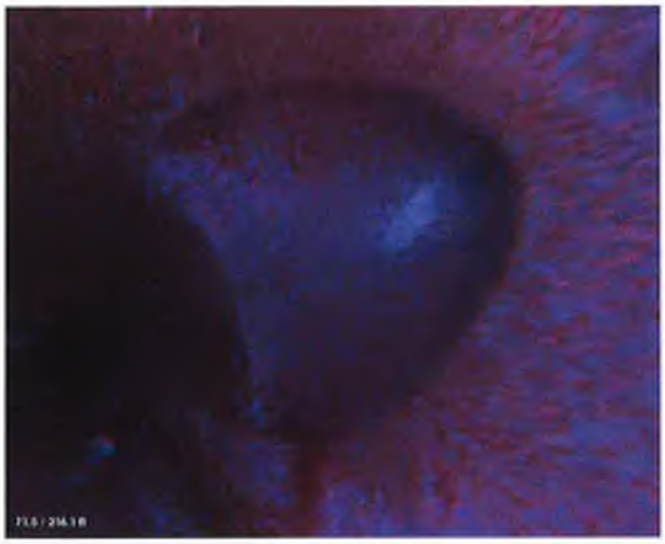
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	56.77
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



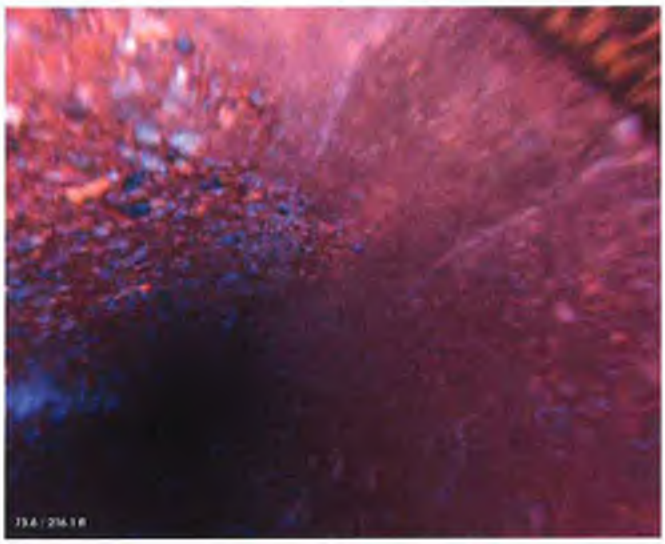
PACP Code:	MWL
Description:	Water Level
Distance (ft):	68.64
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



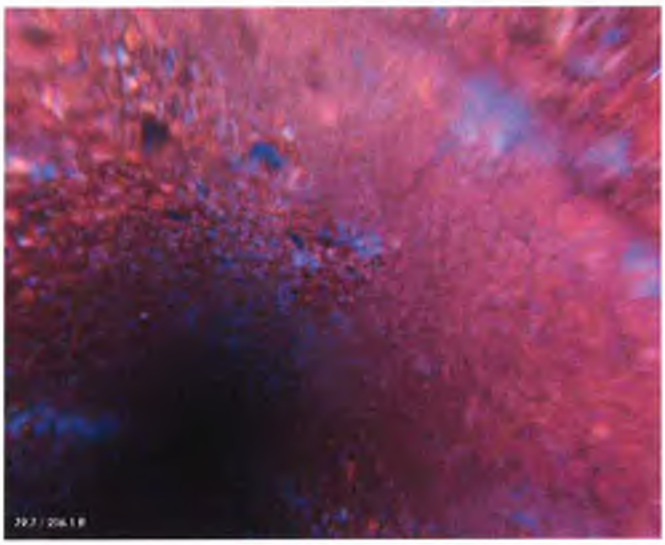
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	70.69
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



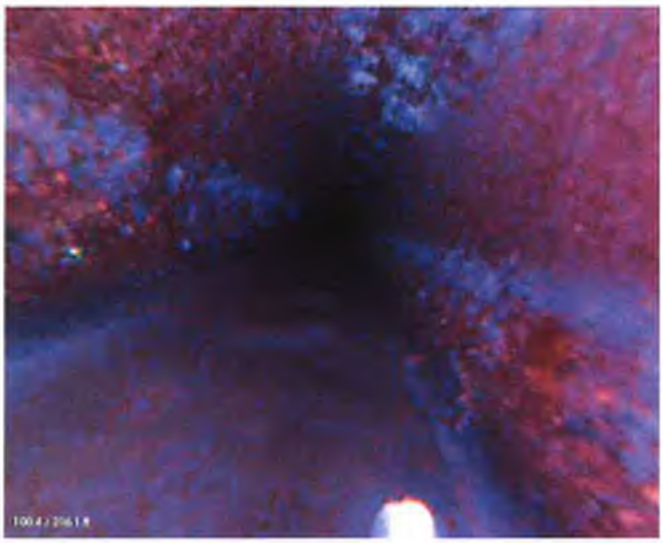
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	71.5
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



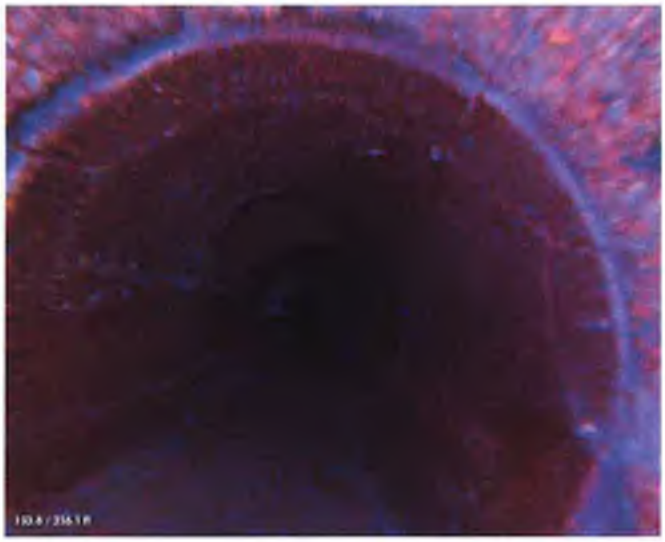
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	73.61
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	12
Clock To:	1
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



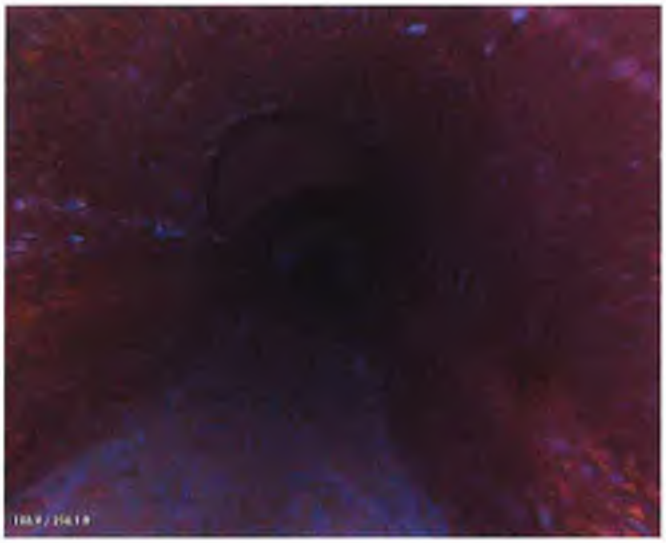
PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	79.65
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	12
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



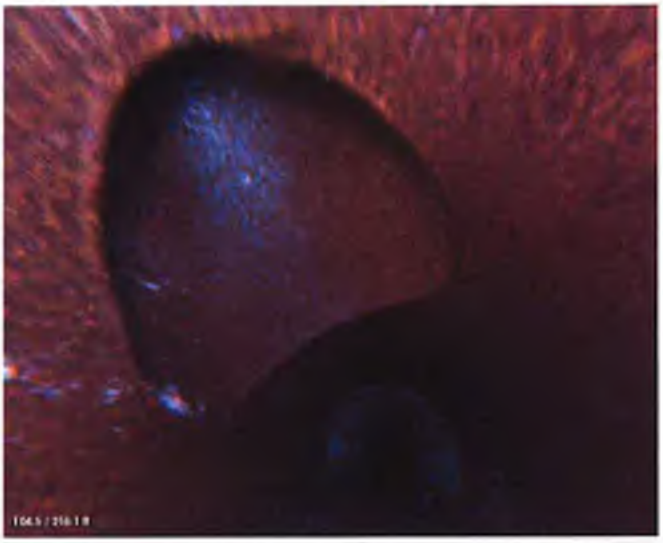
PACP Code:	MGP
Description:	General Photo
Distance (ft):	100.35
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



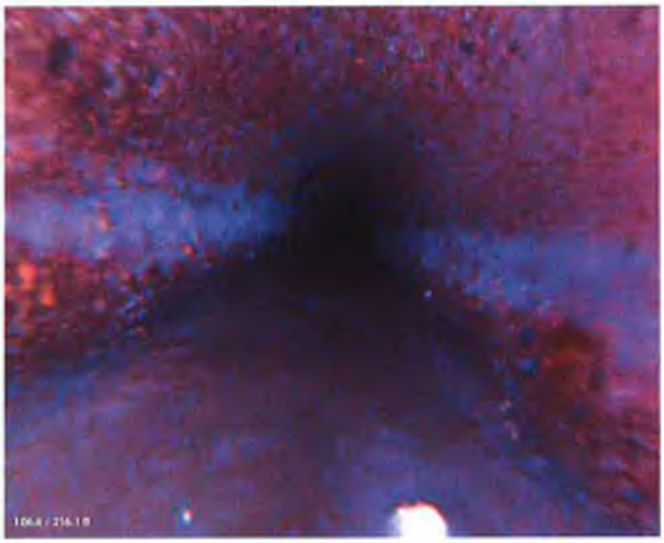
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	103.77
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



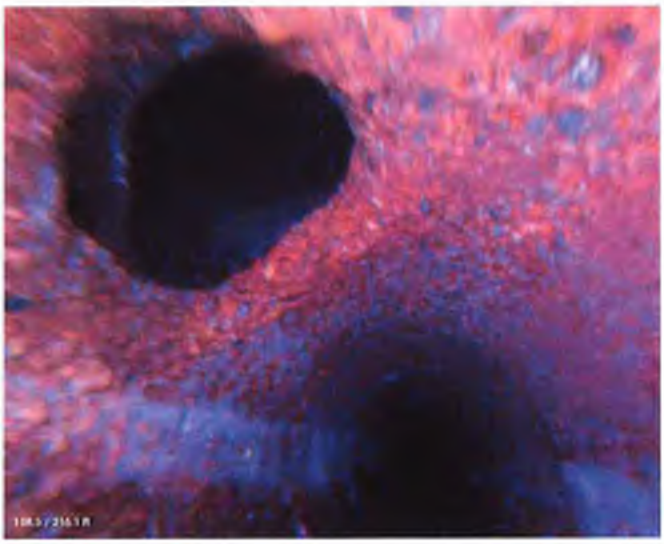
PACP Code:	MMC
Description:	Material Change
Distance (ft):	103.92
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified clay



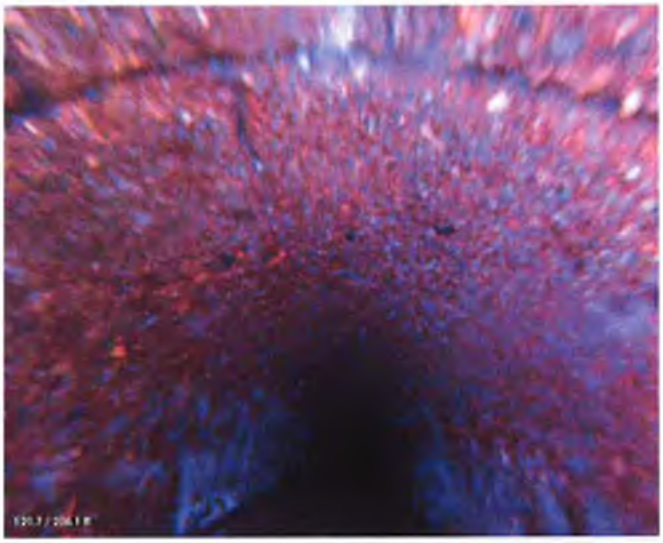
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	104.49
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



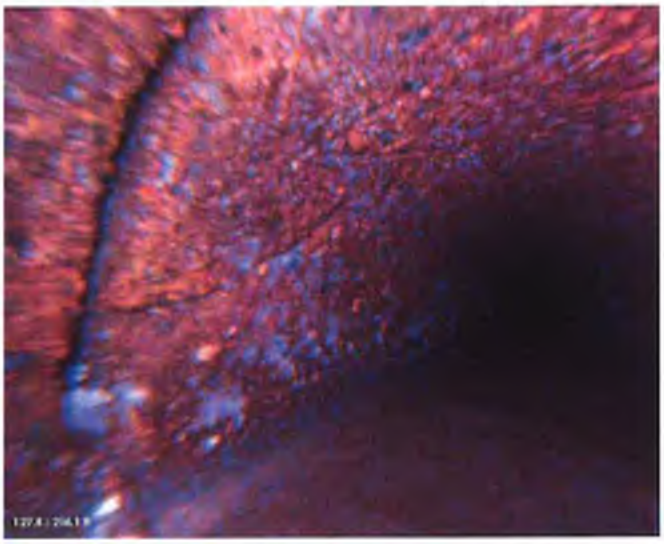
PACP Code:	MMC
Description:	Material Change
Distance (ft):	106.41
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Concrete



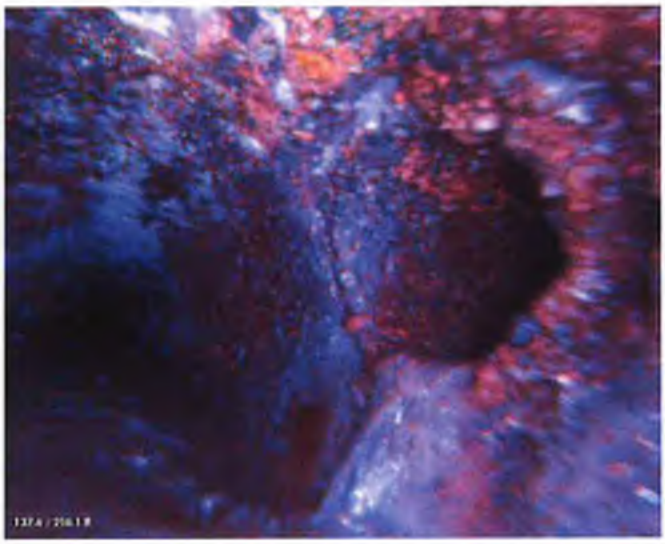
PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	108.53
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



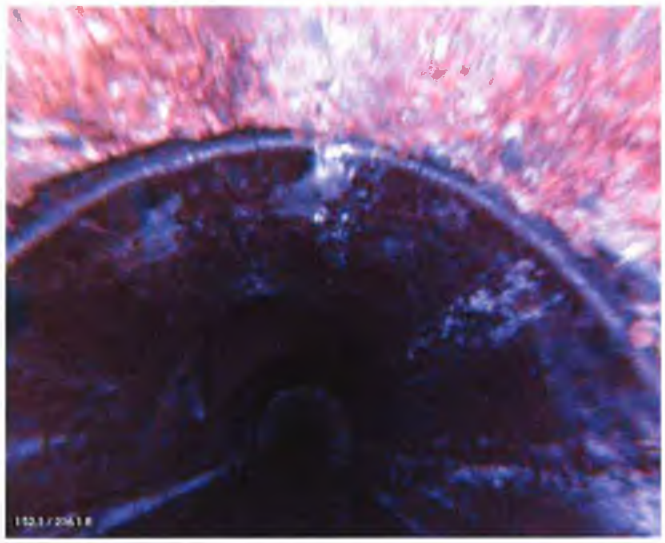
PACP Code:	CL
Description:	Crack Longitudinal
Distance (ft):	121.73
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



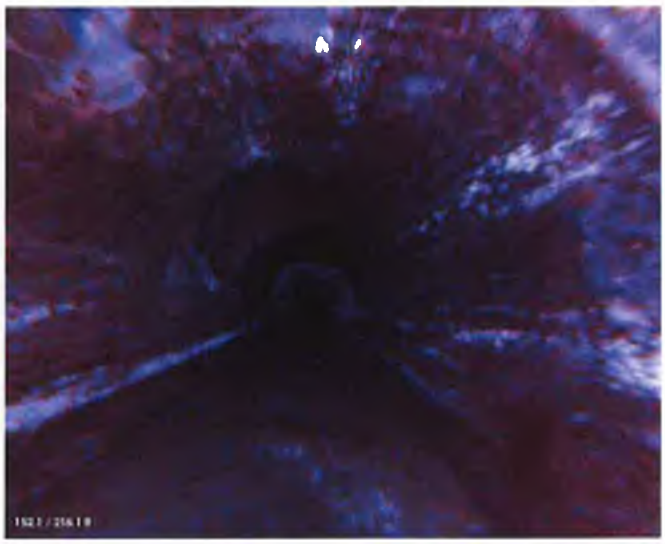
PACP Code:	CS
Description:	Crack Spiral
Distance (ft):	127.8
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	9
Clock To:	10
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



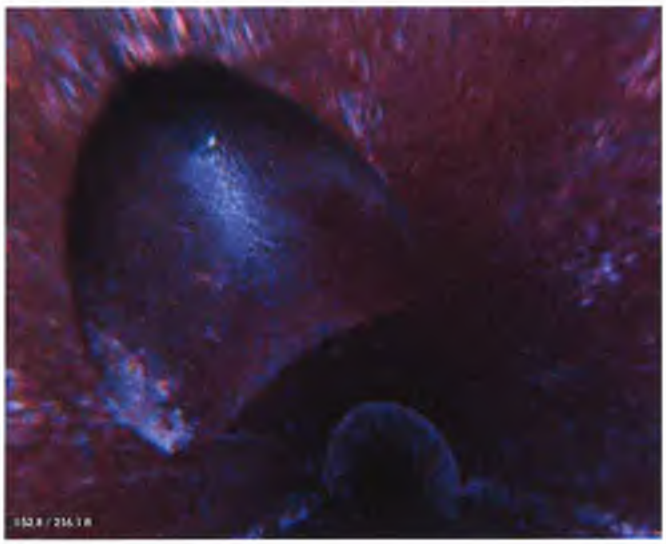
PACP Code:	TBA
Description:	Tap Break-in Active
Distance (ft):	137.59
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	3
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



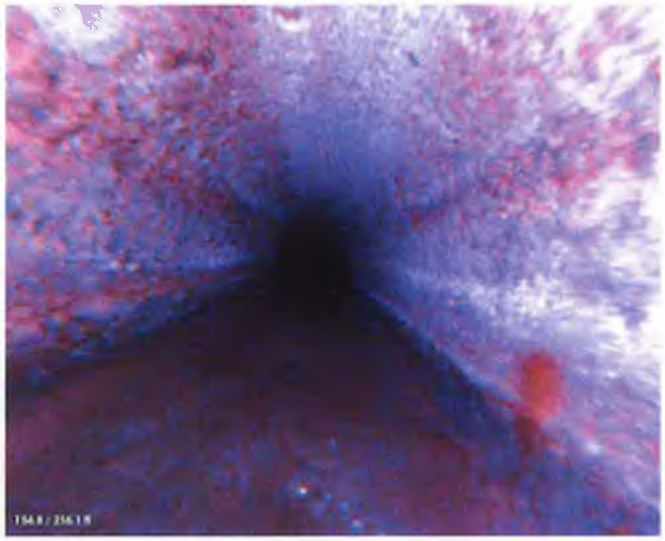
PACP Code:	CM
Description:	Crack Multiple
Distance (ft):	152.08
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	10
Clock To:	2
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	True
Remarks:	



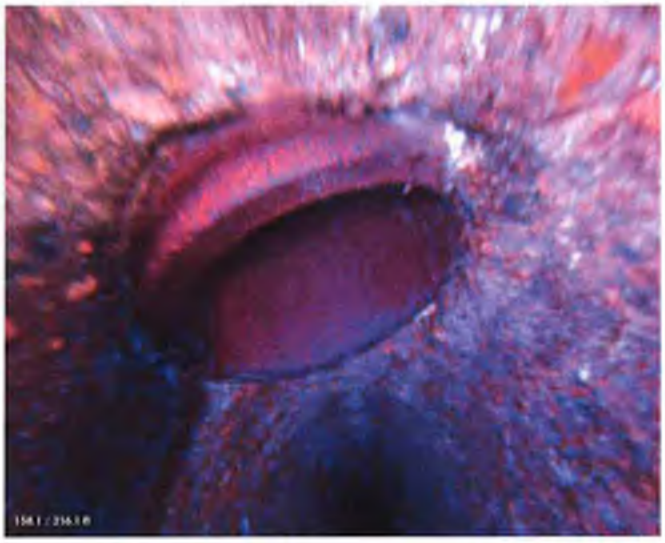
PACP Code:	MMC
Description:	Material Change
Distance (ft):	152.13
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified clay



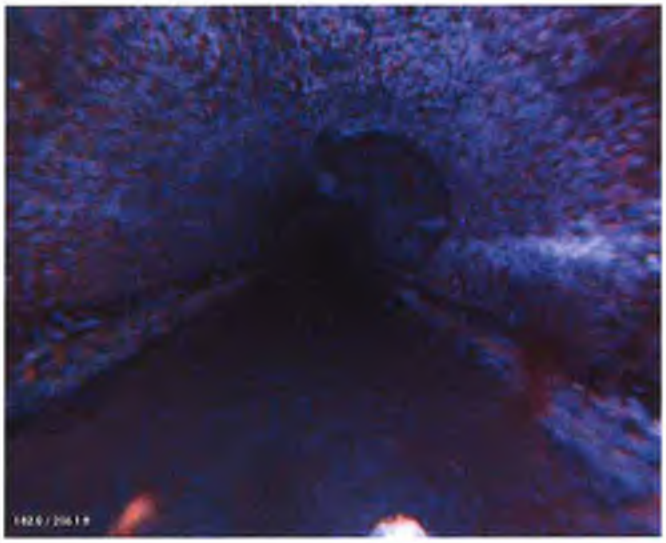
PACP Code:	TF
Description:	Tap Factory
Distance (ft):	152.78
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



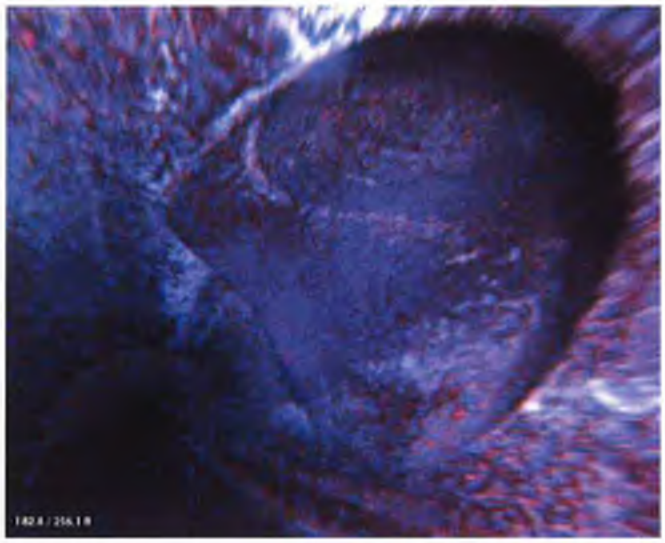
PACP Code:	MMC
Description:	Material Change
Distance (ft):	154.75
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Concrete



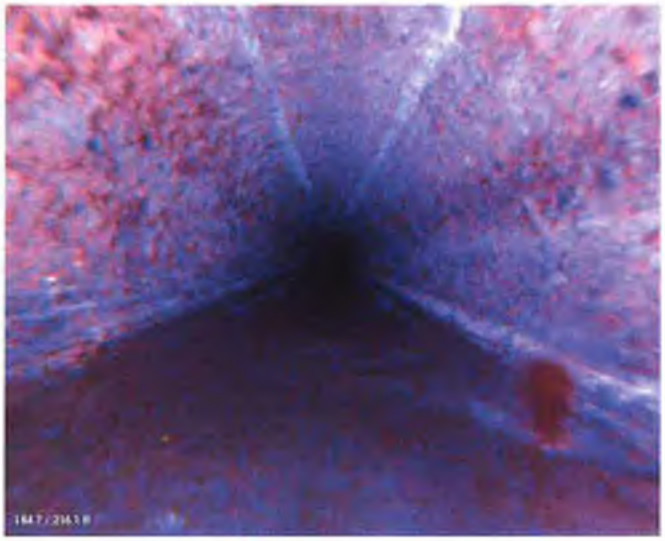
PACP Code:	TBA
Description:	Tap Break-in Active
Distance (ft):	158.11
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	11
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



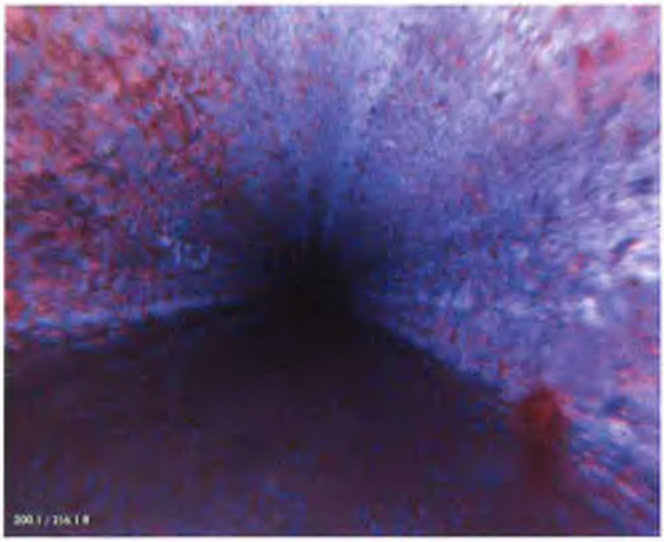
PACP Code:	MMC
Description:	Material Change
Distance (ft):	182.05
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Vitrified clay



PACP Code:	TF
Description:	Tap Factory
Distance (ft):	182.79
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	2
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

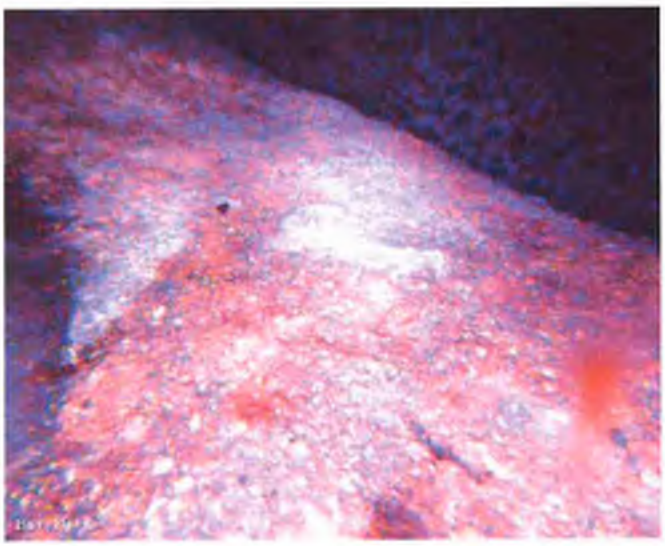


PACP Code:	MMC
Description:	Material Change
Distance (ft):	184.67
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Concrete



PACP Code:	MGP
Description:	General Photo
Distance (ft):	200.08
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	SAP
Description:	Surface Aggregate Projecting
Distance (ft):	214.6
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	F01
Within 8" of Joint:	False
Remarks:	



PACP Code:	AMH
Description:	Manhole
Distance (ft):	216.06
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	End of survey

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-4001 to 07-0009	07-4001	07-0009	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		37	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	06:09 PM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		37
Media Label	Reverse Setup	Work Order No	Additional Info	
NS23-1465	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
21	21	0
Overall Index	Structural Index	Maintenance Index
3	3	0
Overall Quick	Structural Quick	Maintenance Quick
3700	3700	0000

* Recommendation

- Open Trench Pipe Placement 40ft

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 40% of cross sectional area
3	0	[SAP] Surface Aggregate Projecting from 8 to 4 o'clock NOT within 8" of joint Start
3	37.3	[SAP] Surface Aggregate Projecting from 8 to 4 o'clock NOT within 8" of joint End
-	37.3	[AMH] Manhole Remarks: End of survey

Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	40% of cross sectional area				40	☐		
3	0	SAP	Surface Aggregate Projecting	from 8 to 4 o'clock NOT within 8" of joint Start	S01				☐	8	4
3	37.3	SAP	Surface Aggregate Projecting	from 8 to 4 o'clock NOT within 8" of joint End	F01				☐	8	4
-	37.3	AMH	Manhole	Remarks: End of survey					☐		

PACP Code:	AMH		
Description:	Manhole		
Image Name:	f6883029-086e-4bc9-a6c3-a95ed16fb9d8_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

PACP Code:	MWL		
Description:	Water Level		
Image Name:	b0166871-e016-4225-bf51-99fba37cc6b0_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	40		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	SAP		
Description:	Surface Aggregate Projecting		
Image Name:	c53bc10d-3d19-45b6-9088-f68146fa8eaf_0-SAP.jpg		
Distance (ft):	0		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	8	Clock To:	4
1st Value:		2nd Value:	
Continuous Index:	S01	Within 8" of Joint:	☐
Remarks:			

PACP Code:	SAP		
Description:	Surface Aggregate Projecting		
Image Name:	dfa5830a-cfe5-4571-8c68-96c49bff755b_37.3-SAP.jpg		
Distance (ft):	37.3		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	8	Clock To:	4
1st Value:		2nd Value:	
Continuous Index:	F01	Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**f8a7fd0e-6812-4d99-ade9-95d53d5ae1c1_37.3-AMH.jpg**		
Distance (ft):	**37.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-0009 to 07-0008	07-0009	07-0008	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		158	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
Bear Mt Blvd Alley	City of Arvin	Alley	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	05:54 PM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		158
Media Label	Reverse Setup	Work Order No	Additional Info	
NS6-1463	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
OPR	SPR	MPR
Overall Index	Structural Index	Maintenance Index
OPRI	SPRI	MPRI
Overall Quick	Structural Quick	Maintenance Quick
QOR	QSR	QMR

Grade	Dist (ft)	Observation

Recommendation

Open Trench Pipe Replacement
- 158ft

*refer to original front page

CCTV Observation Report

Harris & Associates

Date: 11/30/2010 | Owner: | Pre Clean:
Pipe Length | Surveyor: | Shape:
Customer: | Weather: | Reach:

Street: Bear Mountain Blvd | Flow Control:
City: City of Arvin | Dia/Height (In):
Use: | Material: | Survey Direction: Upstream
US Manhole: 07-0009 | DS Manhole: 07-0008 | Total Length Surveyed:

07-0008

Position	Code	Observation	Video (sec)	Grade
0	SAP	Surface Aggregate Proj.	(Continuous)	S3
0	MWL	Water Level (40%)	WL = 40%	N/A
13.6	FM	Fracture Multiple		S3
19.4	FM	Fracture multiple		S3
25.1	FL	Fracture Longitudinal		S3
31.3	FL	Fracture Longitudinal		S3
37.2	FL	Fracture Longitudinal	-> WL = 40% (J37)	S3
55.4	TBA	Tap Break-In Active	WL = 40%	N/A
63.2	FM	Fracture Multiple	WL = 50%	S3
72.6	MWL	Water Level	50%	N/A
84	FM	Fracture Multiple	WL = 50%	S3
93.1	FL	Fracture Longitudinal	(J92)	S3
100	MGP	General Photo	(WL = 40%)	
101.9	FL	Fracture Longitudinal		S3
110.7	FL	Fracture Longitudinal	(WL = 40%)	S2
150.4	MGP	General Photo	(WL = 40%)	N/A

Upstream

07-0009

- Water Level was consistent @ 40% throughout pipe
- multiple fractures but the sag is not meeting CIPP criteria
-

Recommendation

① Open Trench Pipe Replacement

J 17 - WL > 50%

* 2015 Report (has 2010 Report but no video) 7-8-19
- labeled 07-3002 to 07-3008 in Arvin file

CCTV Observation Report

Harris & Associates

Date: 11/16/19
Pipe Length
Customer: Veolia

Owner: City of Arvin
Surveyor:
Weather: Dry

Pre Clean: Jetting
Shape: Circular
Reach: 07-3002 to 07-0008

Street: Bear Mtn BLVD Alley
City:
Use:
US Manhole: 07-3002

Flow Control: Not Controlled
Dia/Height (in): 8in
Material: Concrete Pipe
DS Manhole: 07-0008

Survey Direction: Upstream
Total Length Surveyed: 185

Joint every 3 ft

Joint every 3 ft

Position	Code	Observation	Video (sec)	Grade
0	MWL	Water Level (15%)		N/A
8	SSS	Surface Spalling (continuous)		S2
40	DAE	Deposit Attached Encrustation		M2
48.1	TFC	Tap Factory Capped		N/A
53.9	TF	Tap Factory		N/A
56.2	TFC	Tap Factory Capped		N/A
80.2	TFC	Tap Factory Capped		N/A
134.1	TFC	Tap Factory Capped		N/A
165.5	TBI	Tap Break In Intruding		M3
181.7	TFC	Tap Factory Capped		N/A
184.6	TBI	Tap Break In Intruding		M3
185	AEP	End of Pipe (Capped)		N/A

Recommendation

- CIPP Lining (185 ft)

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-0008 to 07-0007	07-0008	07-0007	Concrete Pipe (non-reinforced)	8	8
Shape	**Sewer Use**	**Drainage Area**	**Lining Method**	**Total Length**	**Joint Length**
Circular	Sanitary	NA		339	0
Pre-Cleaning	**Clean Date**	**Flow Control**	**Purpose**	**Year Laid**	**Year Renewed**
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
N. Bear	City of Arvin	Light Highway	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	04:20 PM	Upstream
Owner	**Customer**	**Weather**	**PO Number**	**Length Surveyed**
City of Arvin	Veolia	Dry		335
Media Label	**Reverse Setup**	**Work Order No**	**Additional Info**	
NS19-1445	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
340	337	3
Overall Index	**Structural Index**	**Maintenance Index**
3.09	3.09	3
Overall Quick	**Structural Quick**	**Maintenance Quick**
4A3S	4A3R	3100

- due to the many spot repairs that would need to be done and the water level being at least 50% for more than half the pipe length, and the surface aggregate showing, replacing the pipe is optimal

Recommendation

① Open Cut Pipe Replacement (340ft)

07-0007

Camera Direction

Grade	Dist (ft)	Observation	
-	0	[AMH] Manhole Remarks: Begin survey	
-	0	[MWL] Water Level 40% of cross sectional area	(40% Water Level)
3	0	[SAP] Surface Aggregate Projecting from 8 to 4 o'clock NOT within 8" of joint Start	(
-	3.5	[MMC] Material Change Remarks: Vitrified clay	
-	4.8	[TFC] Tap Factory Capped at 2 o'clock	
4	5.6	[FM] Fracture Multiple from 9 to 3 o'clock within 8" of joint	(J3-6) WL=50%
-	6.2	[MMC] Material Change Remarks: Concrete	
-	12.6	[TBA] Tap Break-in Active at 2 o'clock	
3	14.9	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J12-15)
3	20.7	[FL] Fracture Longitudinal at 11 o'clock within 8" of joint	J18-21
3	23.8	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J21-24
3	29.7	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint	J33-36 WL=50%
3	35.7	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J39-42 WL=50%
3	41.6	[FL] Fracture Longitudinal at 11 o'clock within 8" of joint	
-	48.4	[TB] Tap Break-in at 1 o'clock	Tap Break in needs maitnence
-	56.9	[MMC] Material Change Remarks: Vitrified clay	
-	58.2	[TF] Tap Factory at 2 o'clock	
-	59.3	[MMC] Material Change Remarks: Concrete	
3	67.9	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint	J65-68
3	74.1	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J71-74
-	85.4	[TB] Tap Break-in at 12 o'clock	
4	86	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint	WL=40%
-	90.3	[TB] Tap Break-in at 2 o'clock	
3	91.8	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J88-91
3	101	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J98-101
4	104	[FM] Fracture Multiple from 11 to 12 o'clock within 8" of joint	J101-104
-	110.2	[MMC] Material Change Remarks: Vitrified clay	
-	111.3	[TFC] Tap Factory Capped at 2 o'clock	
-	112.6	[MMC] Material Change Remarks: Concrete	
3	118.2	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J118-121
3	121.1	[FL] Fracture Longitudinal at 2 o'clock within 8" of joint	J121-124
-	123.4	[TB] Tap Break-in at 1 o'clock	
-	123.5	[TB] Tap Break-in at 1 o'clock	
3	124.2	[FL] Fracture Longitudinal at 2 o'clock within 8" of joint	J121-124
3	127.1	[FL] Fracture Longitudinal at 11 o'clock within 8" of joint	J121-127
3	133.3	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint	
3	136.3	[FL] Fracture Longitudinal at 2 o'clock within 8" of joint	
3	145	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J143-146
3	148.2	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint	J146-149
-	150.3	[MGP] General Photo	WL = 50%

4	154.2	[FM] Fracture Multiple from 10 to 12 o'clock within 8" of joint
4	160.3	[FM] Fracture Multiple from 2 to 3 o'clock within 8" of joint
3	166	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	175.3	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint
3	184.1	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
4	196	[FM] Fracture Multiple from 11 to 2 o'clock within 8" of joint
-	200.5	[MGP] General Photo
-	208.2	[MMC] Material Change Remarks: Vitrified clay
-	209.5	[TFC] Tap Factory Capped at 2 o'clock
4	210.6	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint
-	211.1	[MMC] Material Change Remarks: Concrete
4	216.3	[FM] Fracture Multiple from 10 to 1 o'clock within 8" of joint
4	222.4	[FM] Fracture Multiple from 11 to 12 o'clock within 8" of joint
3	234.1	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint
3	237.3	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	240.1	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	246	[FL] Fracture Longitudinal at 10 o'clock within 8" of joint
-	250	[MGP] General Photo
3	255	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	258	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	273	[FL] Fracture Longitudinal at 10 o'clock within 8" of joint
-	276.3	[MMC] Material Change Remarks: Vitrified clay
-	277.5	[TFC] Tap Factory Capped at 2 o'clock
-	278.8	[MMC] Material Change Remarks: Concrete
3	282.2	[TBI] Tap Break-in Intruding at 2 o'clock NOT within 8" of joint
4	290.6	[FM] Fracture Multiple from 11 to 2 o'clock within 8" of joint
3	293.4	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint
3	299.2	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	300.3	[MGP] General Photo
3	308.4	[FL] Fracture Longitudinal at 3 o'clock within 8" of joint
3	317.5	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	326.7	[MMC] Material Change Remarks: Vitrified clay
-	327.9	[TFC] Tap Factory Capped at 2 o'clock
-	327.9	[MMC] Material Change Remarks: Concrete
3	335.4	[SAP] Surface Aggregate Projecting from 8 to 4 o'clock NOT within 8" of joint End

J152 - 155
J167 - 160 m = 50
J163 - 160

due to WL = 50% - 7 OCR

07-0008

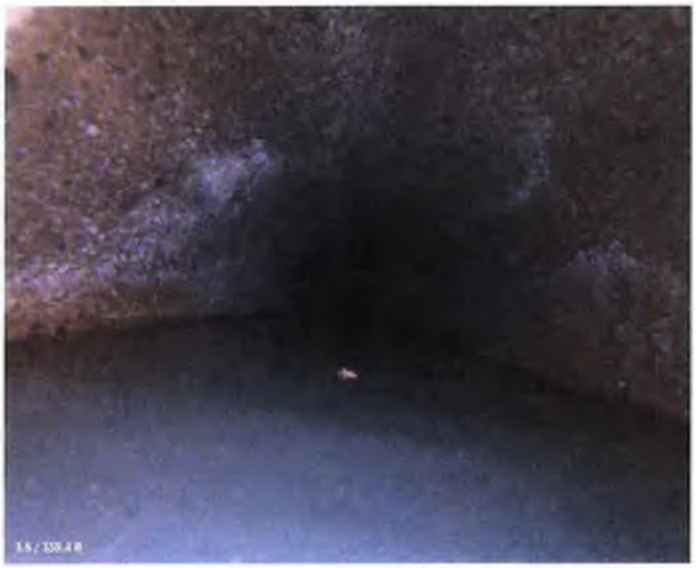
Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	40% of cross sectional area				40	☐		
3	0	SAP	Surface Aggregate Projecting	from 8 to 4 o'clock NOT within 8" of joint Start	S01				☐	8	4

-	3.5	MMC	Material Change	Remarks: Vitrified clay					☐		
-	4.8	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
4	5.6	FM	Fracture Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3
-	6.2	MMC	Material Change	Remarks: Concrete					☐		
-	12.6	TBA	Tap Break-in Active	at 2 o'clock		4			☐	2	
3	14.9	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	20.7	FL	Fracture Longitudinal	at 11 o'clock within 8" of joint					☑	11	
3	23.8	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	29.7	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
3	35.7	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	41.6	FL	Fracture Longitudinal	at 11 o'clock within 8" of joint					☑	11	
-	48.4	TB	Tap Break-in	at 1 o'clock		2			☐	1	
-	56.9	MMC	Material Change	Remarks: Vitrified clay					☐		
-	58.2	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	59.3	MMC	Material Change	Remarks: Concrete					☐		
3	67.9	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
3	74.1	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	85.4	TB	Tap Break-in	at 12 o'clock		4			☐	12	
4	86	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint					☑	10	2
-	90.3	TB	Tap Break-in	at 2 o'clock		4			☐	2	
3	91.8	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	101	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
4	104	FM	Fracture Multiple	from 11 to 12 o'clock within 8" of joint					☑	11	12
-	110.2	MMC	Material Change	Remarks: Vitrified clay					☐		
-	111.3	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	112.6	MMC	Material Change	Remarks: Concrete					☐		
3	118.2	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	121.1	FL	Fracture Longitudinal	at 2 o'clock within 8" of joint					☑	2	
-	123.4	TB	Tap Break-in	at 1 o'clock		4			☐	1	
-	123.5	TB	Tap Break-in	at 1 o'clock		4			☐	1	
3	124.2	FL	Fracture Longitudinal	at 2 o'clock within 8" of joint					☑	2	
3	127.1	FL	Fracture Longitudinal	at 11 o'clock within 8" of joint					☑	11	
3	133.3	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
3	136.3	FL	Fracture Longitudinal	at 2 o'clock within 8" of joint					☑	2	
3	145	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	148.2	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	150.3	MGP	General Photo						☐		
4	154.2	FM	Fracture Multiple	from 10 to 12 o'clock within 8" of joint					☑	10	12
4	160.3	FM	Fracture Multiple	from 2 to 3 o'clock within 8" of joint					☑	2	3
3	166	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	175.3	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
3	184.1	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
4	196	FM	Fracture Multiple	from 11 to 2 o'clock within 8" of joint					☑	11	2
-	200.5	MGP	General Photo						☐		

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**3dc0199a-8973-461e-a43e-a19a34d0101f_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**40**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

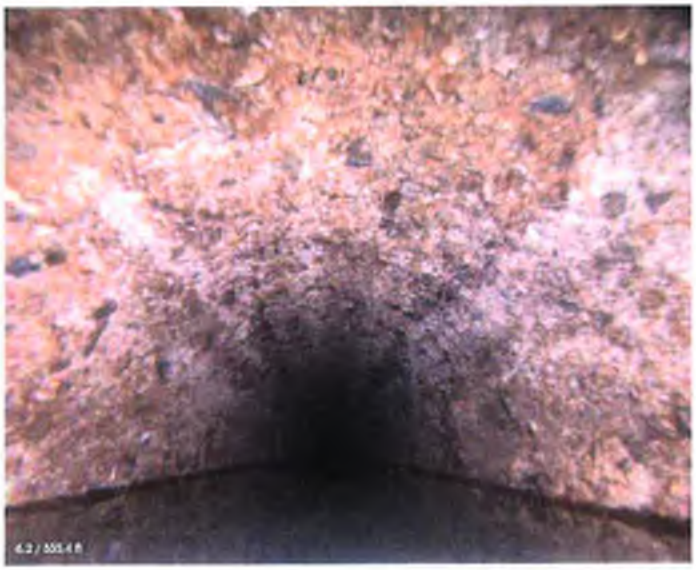
PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**28d6525a-80ff-45f4-bb5f-0b33cd28cc20_0-SAP.jpg**		
Distance (ft):	**0**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:	**S01**	Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**36413f92-5fd1-4d57-bb9e-cb848f5adc33_3.5-MMC.jpg**		
Distance (ft):	**3.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

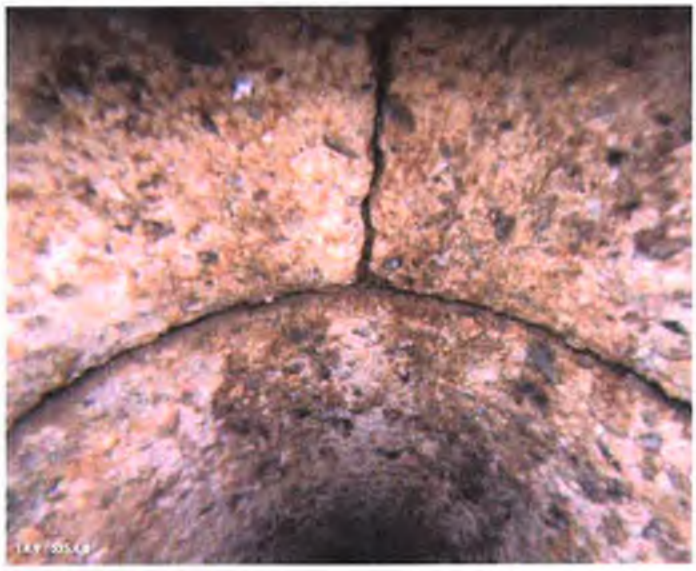
PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**a5ace59e-d0e2-490f-a337-17d621e48b49_4.8-TFC.jpg**		
Distance (ft):	**4.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**49525598-721a-48dd-8df2-b7d4af6524ce_5.6-FM.jpg**		
Distance (ft):	**5.6**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

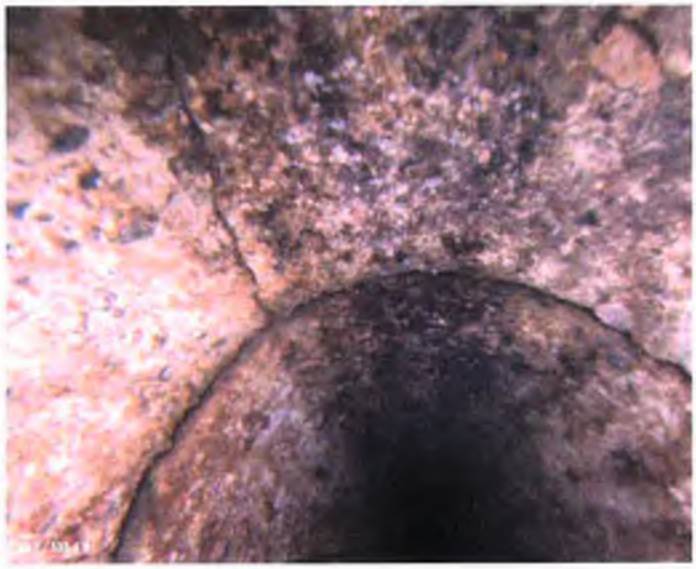


PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**1b6fd1da-582c-4a9d-b18f-9e3ab6c39bd8_6.2-MMC.jpg**		
Distance (ft):	**6.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

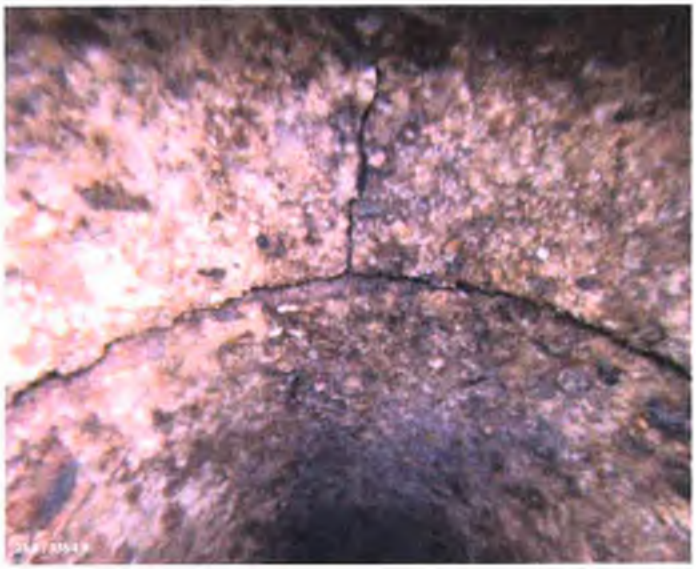
PACP Code:	TBA		
Description:	**Tap Break-in Active**		
Image Name:	**ba69c2e8-6a7d-4bdf-84c3-faadecdc5e8b_12.6-TBA.jpg**		
Distance (ft):	**12.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



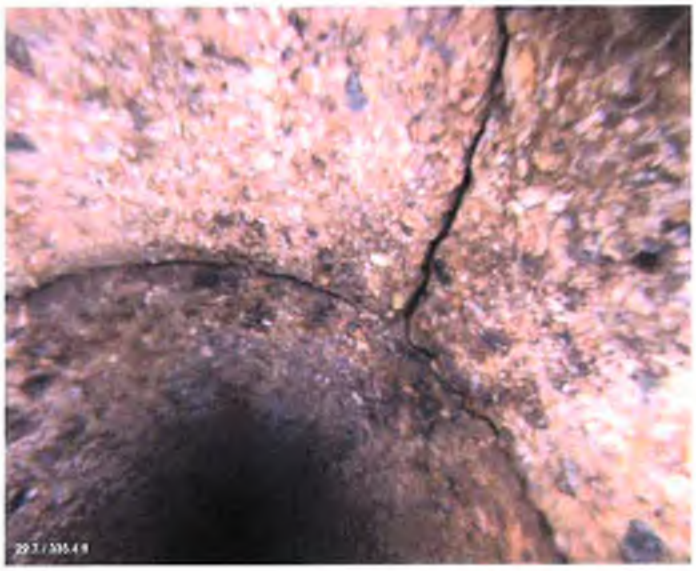
PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**243cf892-88de-4f11-b694-8d6d5d1a5f03_14.9-FL.jpg**		
Distance (ft):	**14.9**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



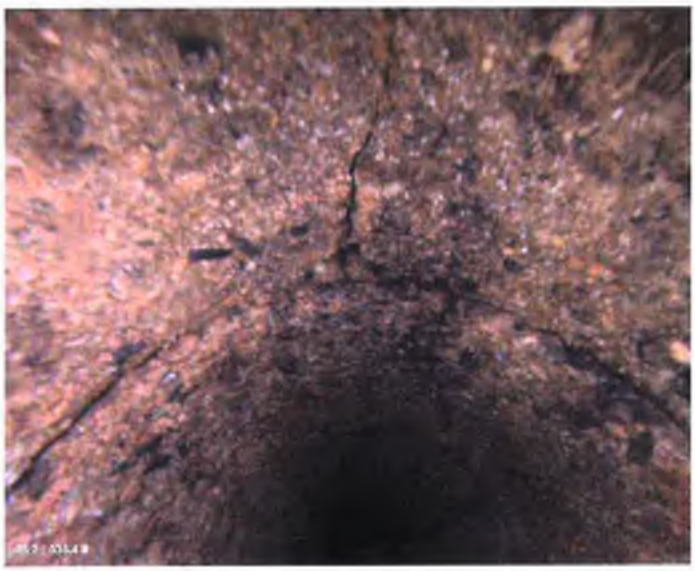
PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**ccacebef-a2e9-47f1-a2f8-c1393a63489c_20.7-FL.jpg**		
Distance (ft):	**20.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**c1ffad7b-1a6d-455f-b852-88c12dd906de_23.8-FL.jpg**		
Distance (ft):	**23.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

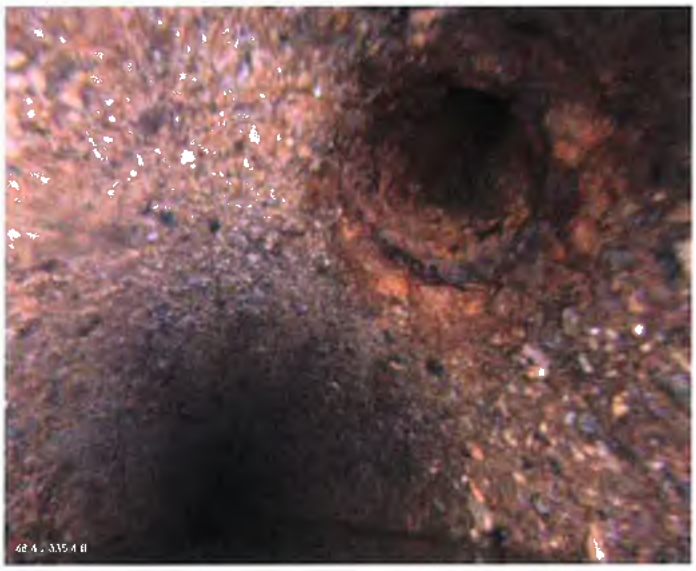


PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**de471c6b-2dfc-40a7-8743-e3dbef9d6380_29.7-FL.jpg**		
Distance (ft):	**29.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

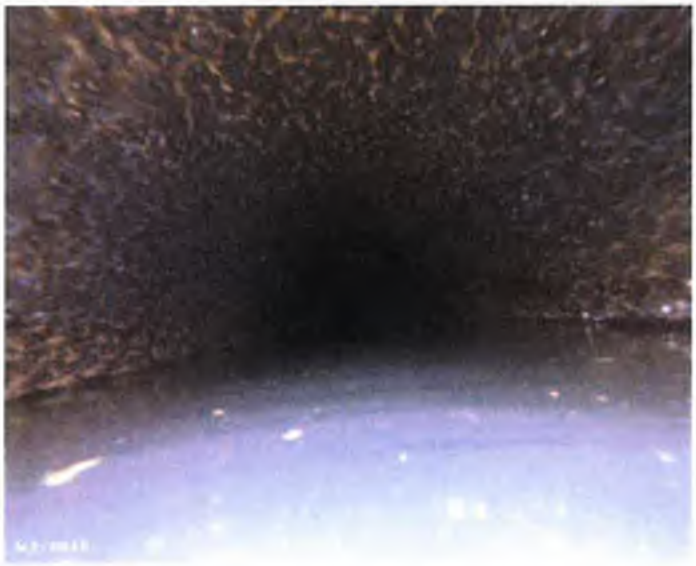


PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**6f513375-c8a0-46f9-8486-76990c955828_35.7-FL.jpg**		
Distance (ft):	**35.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

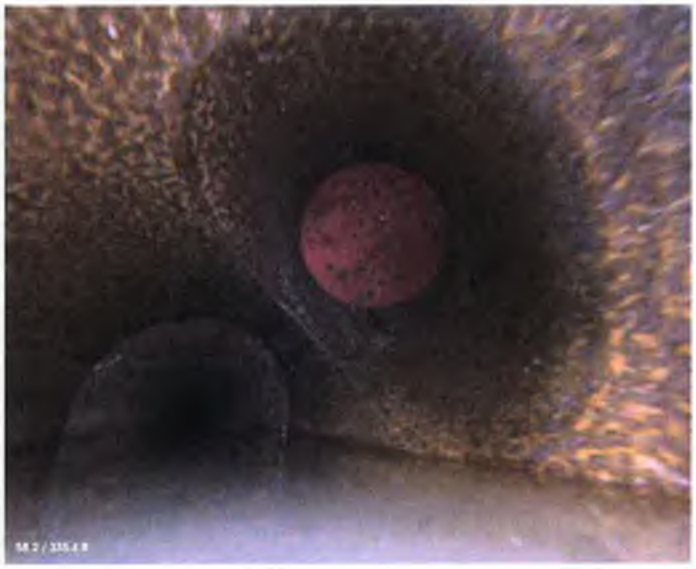
PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	4ca44b75-1fb0-4cc1-982e-d5eaad109b60_41.6-FL.jpg		
Distance (ft):	41.6		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



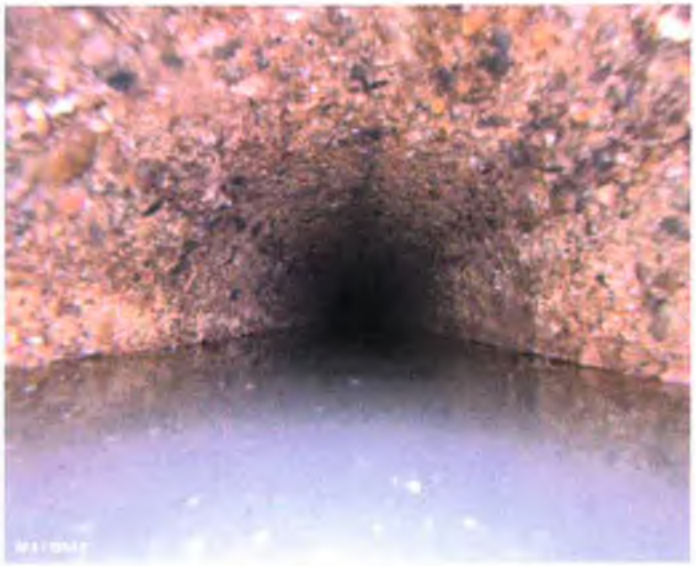
PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	4cc80beb-0748-4f41-802a-339fa49402f8_48.4-TB.jpg		
Distance (ft):	48.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:	2	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	MMC		
Description:	Material Change		
Image Name:	c754cf64-2887-42ec-a475-896aaf0cc6e7_56.9-MMC.jpg		
Distance (ft):	56.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Vitrified clay		

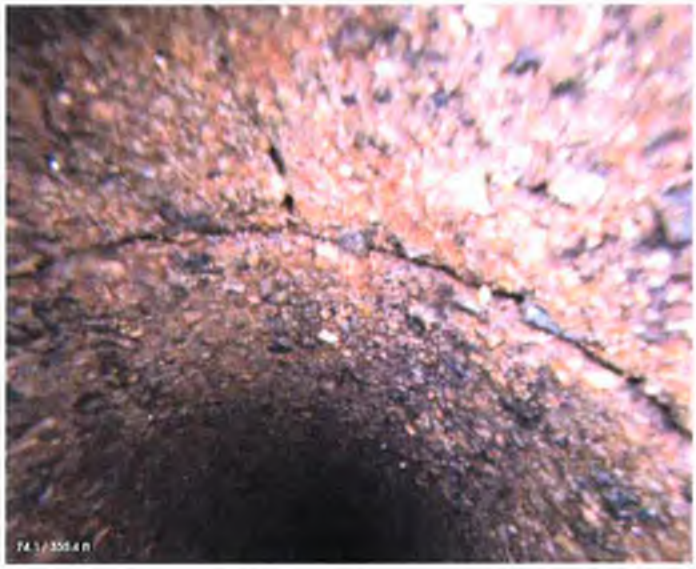


PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**528af8b4-ef7c-47cb-bb45-9712508175b4_58.2-TF.jpg**		
Distance (ft):	**58.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

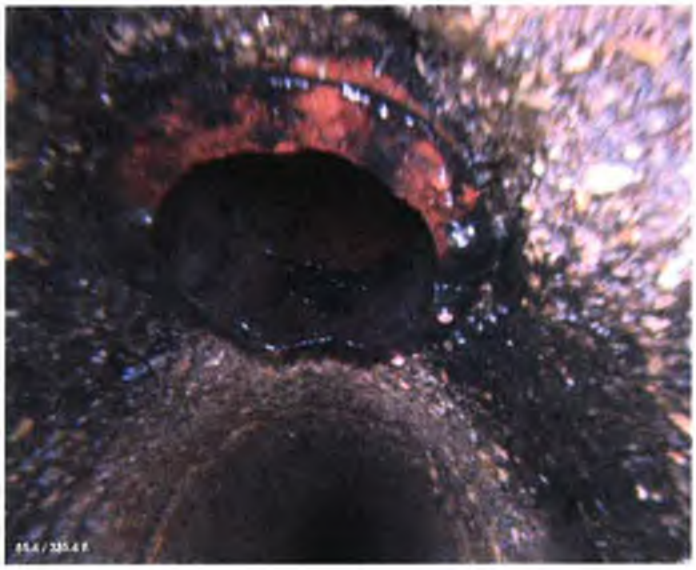


PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**ae34f5c1-1f60-4639-8133-30288c02a9ac_59.3-MMC.jpg**		
Distance (ft):	**59.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**b7d6c2d0-7528-4906-80cd-c454ca2ee25b_67.9-FL.jpg**		
Distance (ft):	**67.9**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

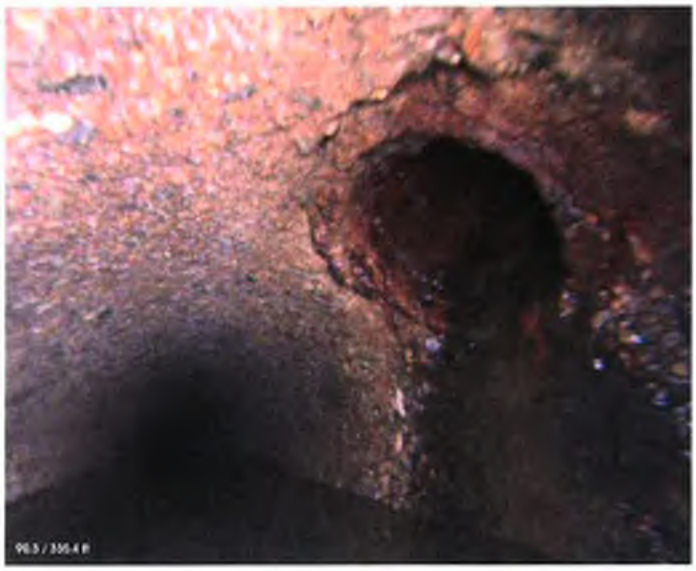


PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	c140dea2-a513-4e5f-a07d-73d91816c766_74.1-FL.jpg		
Distance (ft):	74.1		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	458666a3-56bd-44cd-932a-d8d5d42adb67_85.4-TB.jpg		
Distance (ft):	85.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

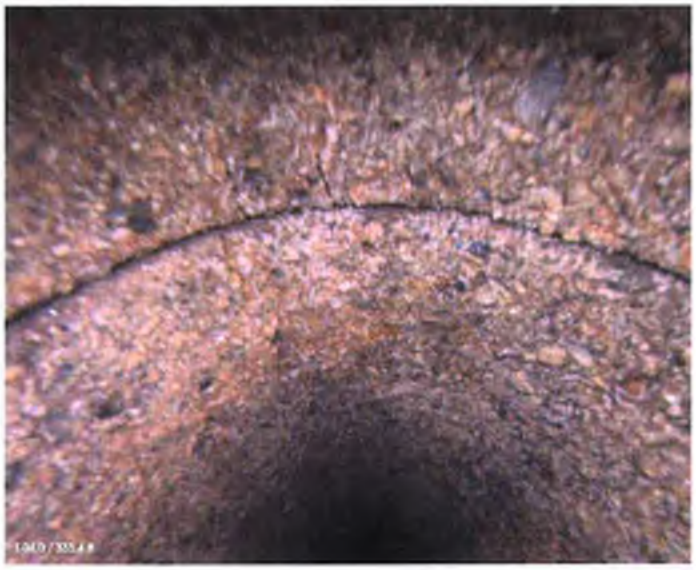
PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	13eaf668-3b70-4f1c-8bcb-86a5c24f00f3_86-FM.jpg		
Distance (ft):	86		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	2
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



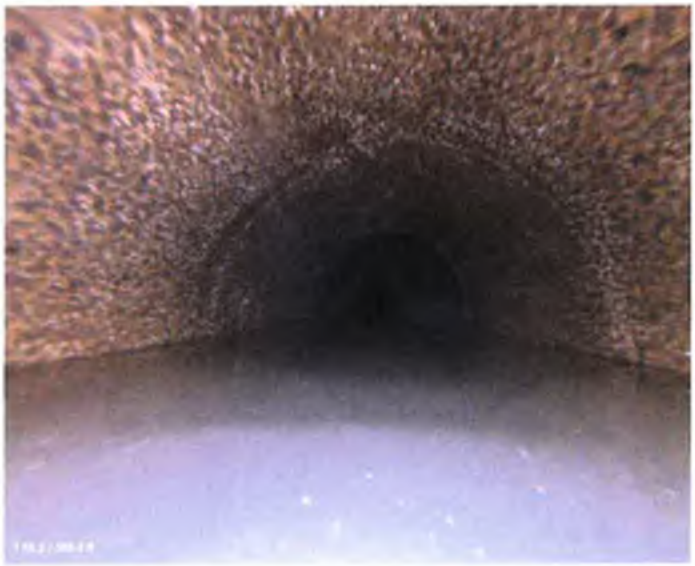
PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	1ee0c1d1-fb3c-4702-953a-2e62a4dc5d01_90.3-TB.jpg		
Distance (ft):	90.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	9eb642da-7841-46fb-a4b5-4410674a21c2_91.8-FL.jpg		
Distance (ft):	91.8		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

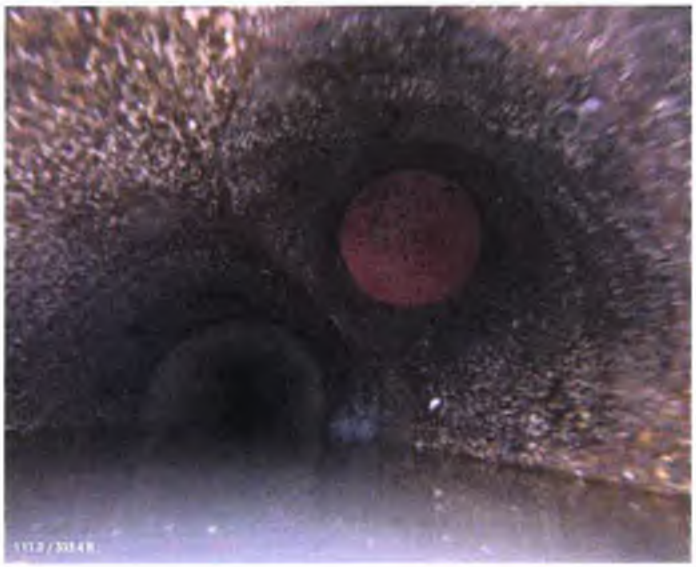
PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	8e151b7b-f8f0-466d-a9f7-54bb6f827826_101-FL.jpg		
Distance (ft):	101		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**d4ae8357-27d3-45e6-9751-49ff03af2075_104-FM.jpg**		
Distance (ft):	**104**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**12**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**7f46321c-0ff4-4242-afc6-f1e2d2644ba4_110.2-MMC.jpg**		
Distance (ft):	**110.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**79166d6c-f768-4e01-b6da-ed6b8cda1442_111.3-TFC.jpg**		
Distance (ft):	**111.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**223307f2-a1d1-40ea-a2a4-c7476883cb56_112.6-MMC.jpg**		
Distance (ft):	**112.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

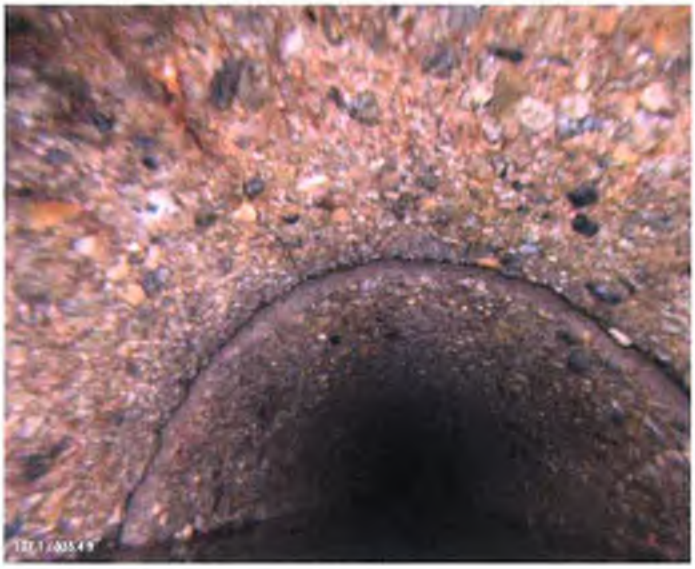
PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**a579c34b-f3d6-48a1-8aef-0659be607f43_118.2-FL.jpg**		
Distance (ft):	**118.2**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**ac54dccb-559f-44f3-a608-c4bf3cdbaf87_121.1-FL.jpg**		
Distance (ft):	**121.1**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	e0a682af-5b9c-4f71-98eb-a5007b471045_123.4-TB.jpg		
Distance (ft):	123.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	47c371e2-9f7d-4eed-af15-f590ea47f2c3_123.5-TB.jpg		
Distance (ft):	123.5		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	aafb75ce-b577-4717-a8d3-00898431785c_124.2-FL.jpg		
Distance (ft):	124.2		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**7f3d45d3-629a-4048-80a0-e254626dc932_127.1-FL.jpg**		
Distance (ft):	**127.1**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**2aa30b45-ab97-4cd3-a430-588e68dcb2a3_133.3-FL.jpg**		
Distance (ft):	**133.3**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**08b12f6f-7c8a-4647-8857-5429776d4f80_136.3-FL.jpg**		
Distance (ft):	**136.3**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**f5633f9e-cfae-47ff-a4a7-c351254b555e_145-FL.jpg**		
Distance (ft):	**145**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**bc7d74aa-a239-4052-ab71-95898f3d418e_148.2-FL.jpg**		
Distance (ft):	**148.2**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

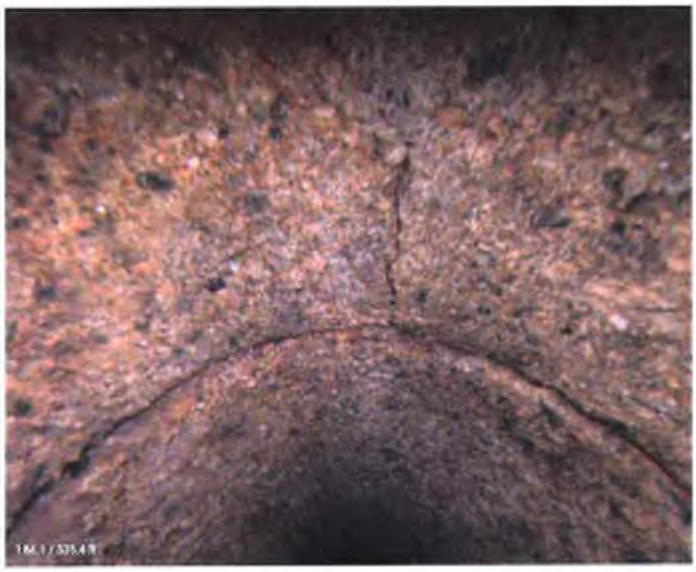
PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**87decd6a-7059-4f60-bbed-379c76220448_150.3-MGP.jpg**		
Distance (ft):	**150.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**4a10f864-f6dc-4ad5-ac8d-a1d8ef4a46b4_154.2-FM.jpg**		
Distance (ft):	**154.2**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**12**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

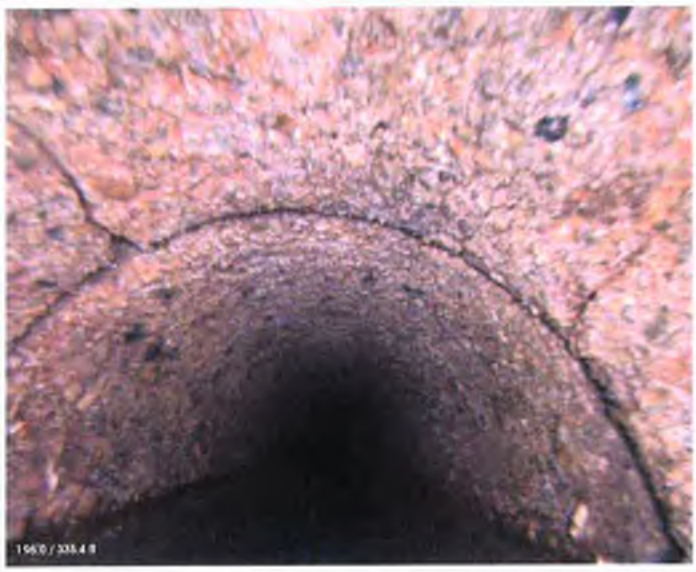
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**28ee68e5-217a-4fca-900d-bfa018ba05f8_160.3-FM.jpg**		
Distance (ft):	**160.3**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**f4dea0a4-4e7f-412e-b6db-e155b75270f1_166-FL.jpg**		
Distance (ft):	**166**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**994d46b3-9b58-43c8-970e-a8237456b04a_175.3-FL.jpg**		
Distance (ft):	**175.3**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



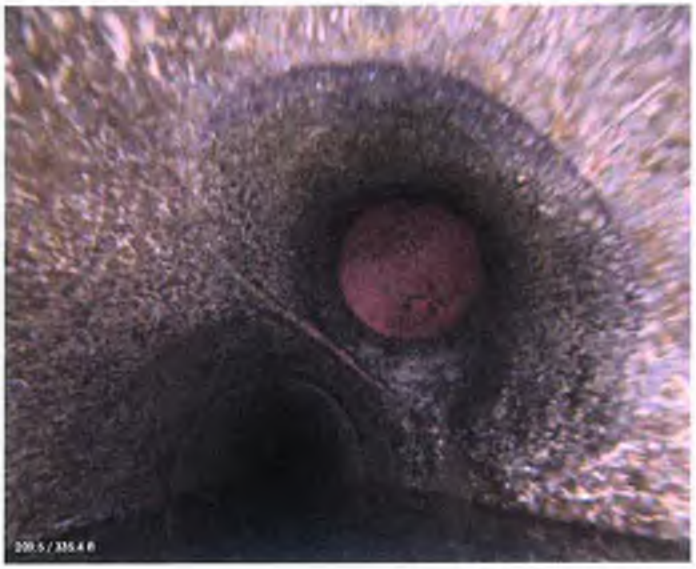
PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**cb39bc1c-d99e-47b9-969e-1c97fd64d5c9_184.1-FL.jpg**		
Distance (ft):	**184.1**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**09026987-086e-4f46-bf17-b5da7652ed29_196-FM.jpg**		
Distance (ft):	**196**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**a831f001-c95c-40f4-827b-22860828b562_200.5-MGP.jpg**		
Distance (ft):	**200.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

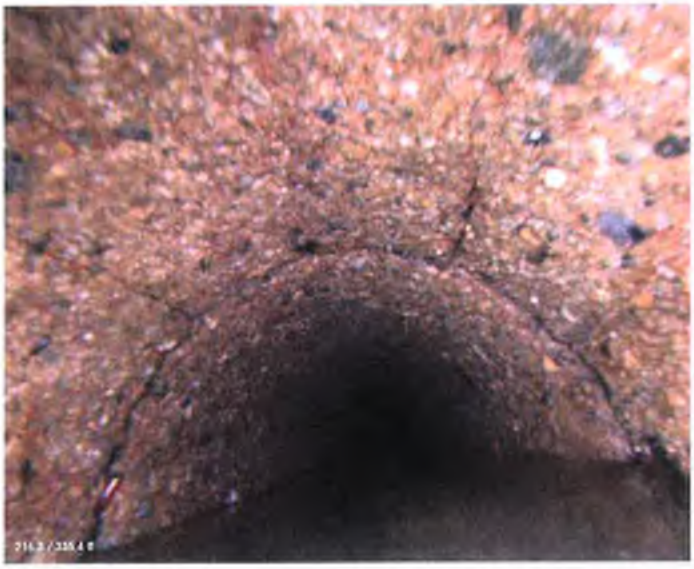
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**8493e41d-7a5e-4ff6-8f2b-6ff30b6ad9ab_208.2-MMC.jpg**		
Distance (ft):	**208.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



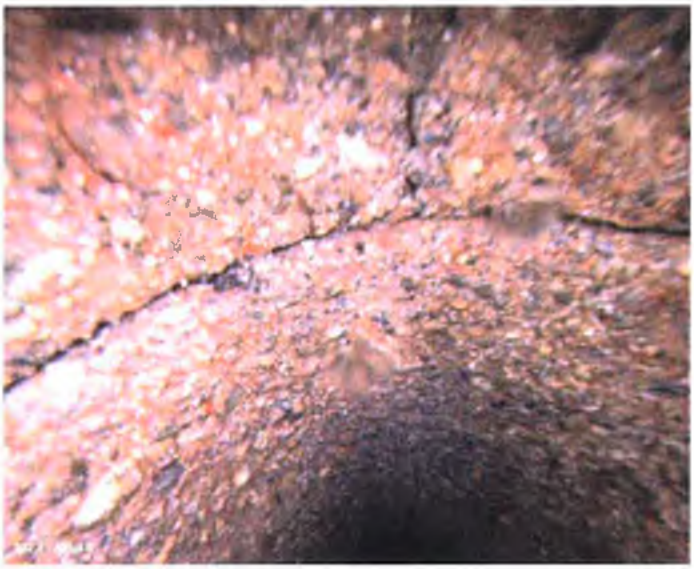
PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**013cd378-e20f-4347-8b0a-471165b66756_209.5-TFC.jpg**		
Distance (ft):	**209.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**1ae36483-9149-4b78-8396-8e7fba75d8f9_210.6-FM.jpg**		
Distance (ft):	**210.6**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

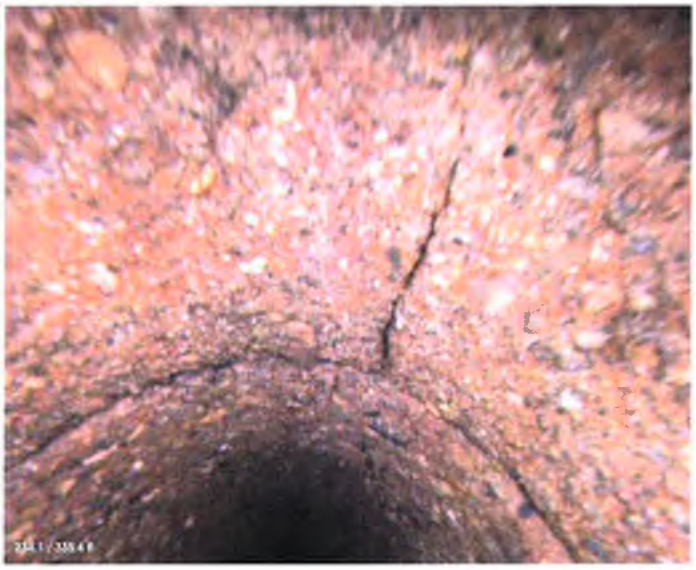
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**282b87b1-1dba-4d1f-97b7-f2222fd81d95_211.1-MMC.jpg**		
Distance (ft):	**211.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		



PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**31eca12e-541d-4aa5-8575-bfd0c3c4c8ba_216.3-FM.jpg**		
Distance (ft):	**216.3**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

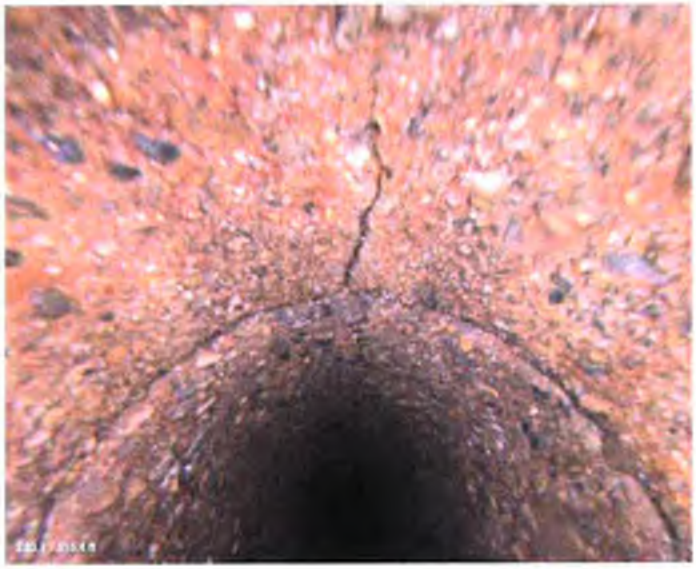


PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	8794ca9a-c381-40de-a01e-1cfbc1ca1dfc_222.4-FM.jpg		
Distance (ft):	222.4		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	12
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

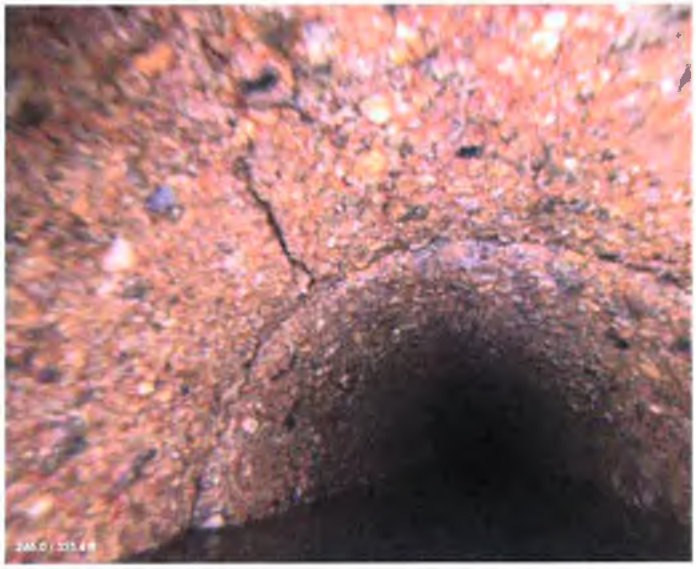


PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	c914d4b3-b4c0-4798-8b9c-f588d88a4294_234.1-FL.jpg		
Distance (ft):	234.1		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	1d7b86f4-7646-4e70-b1e3-1fa3e87171cf_237.3-FL.jpg		
Distance (ft):	237.3		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



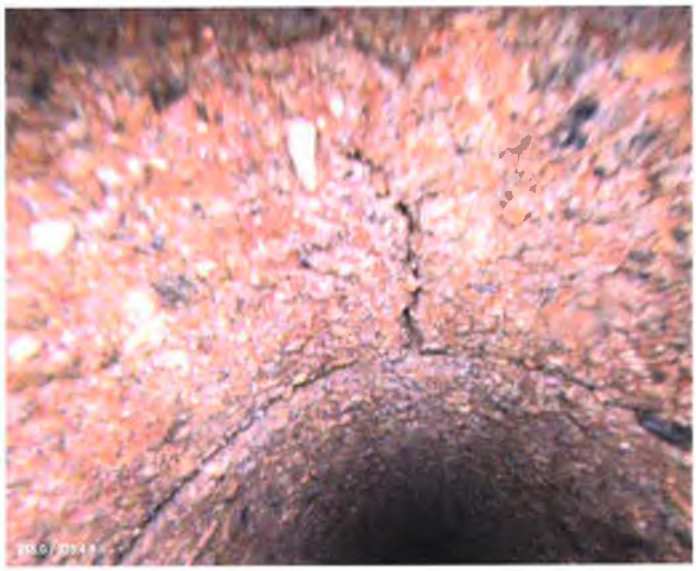
PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**89a8bcde-c1e6-4ae8-bc23-a5527267b805_240.1-FL.jpg**		
Distance (ft):	**240.1**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**228be74d-37e9-4fca-831c-cfbf42d118f2_246-FL.jpg**		
Distance (ft):	**246**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

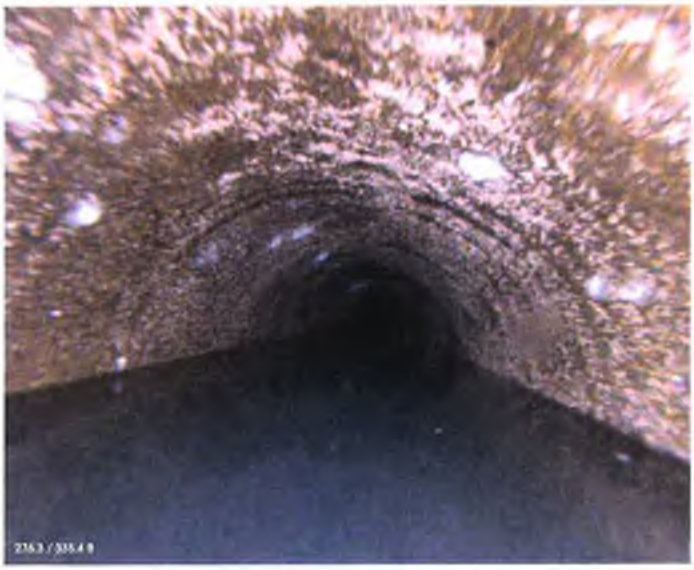
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**611f784c-d0a3-4448-9214-93b402c8ab43_250-MGP.jpg**		
Distance (ft):	**250**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**ae2d6088-8342-4782-8a6c-83df374fd98c_255-FL.jpg**		
Distance (ft):	**255**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**d93671c4-ea82-4641-a89c-8dd9989e94df_258-FL.jpg**		
Distance (ft):	**258**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**27ae07b4-6319-4fb9-b542-1483581bc3fa_273-FL.jpg**		
Distance (ft):	**273**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



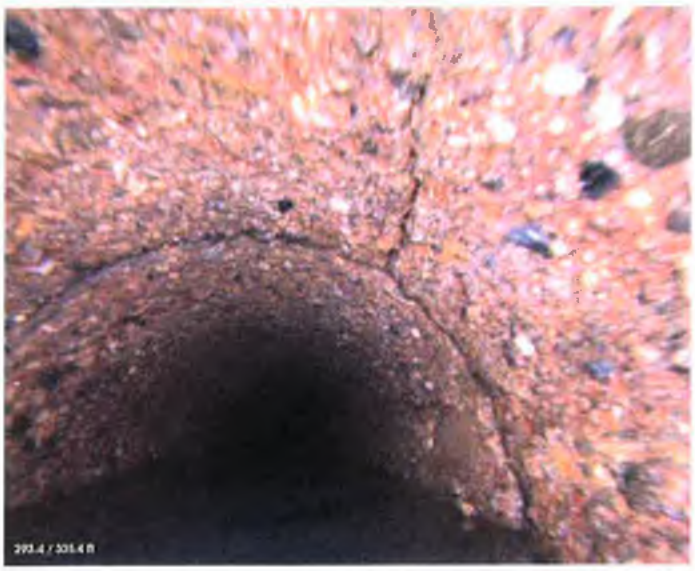
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**68275efe-11a3-4032-a475-74b49cd2afce_276.3-MMC.jpg**		
Distance (ft):	**276.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**1d2cc459-7301-4e17-8a39-8559b23abfbc_277.5-TFC.jpg**		
Distance (ft):	**277.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

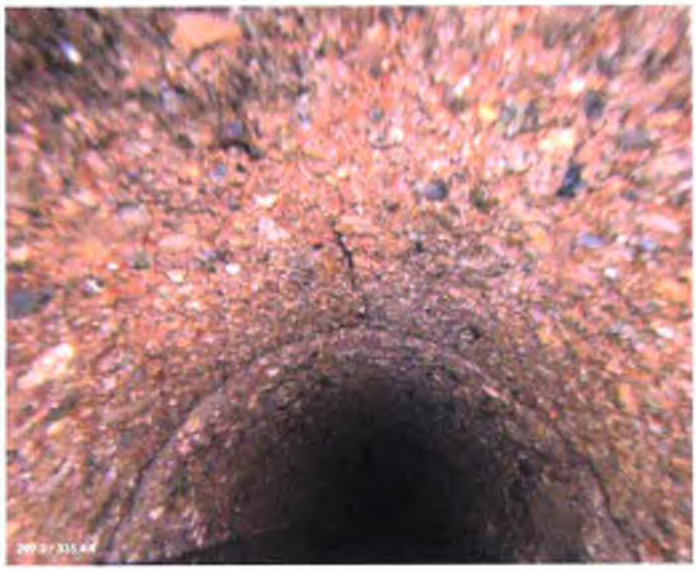
PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**1878bbce-182c-40d5-baf6-2a7b0b21d1bd_278.8-MMC.jpg**		
Distance (ft):	**278.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	TBI		
Description:	Tap Break-In Intruding		
Image Name:	1ca31caf-7163-48ea-b032-a66ad9ec455c_282.2-TBI.jpg		
Distance (ft):	282.2		
Structural Grade:	0	Maintenance Grade	3
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	1
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	382b133a-1bbb-405b-b0d0-8d97c0ce3867_290.6-FM.jpg		
Distance (ft):	290.6		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	2
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	4a1ae28f-2778-4e50-86c0-ba4b4080c8b2_293.4-FL.jpg		
Distance (ft):	293.4		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	1	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



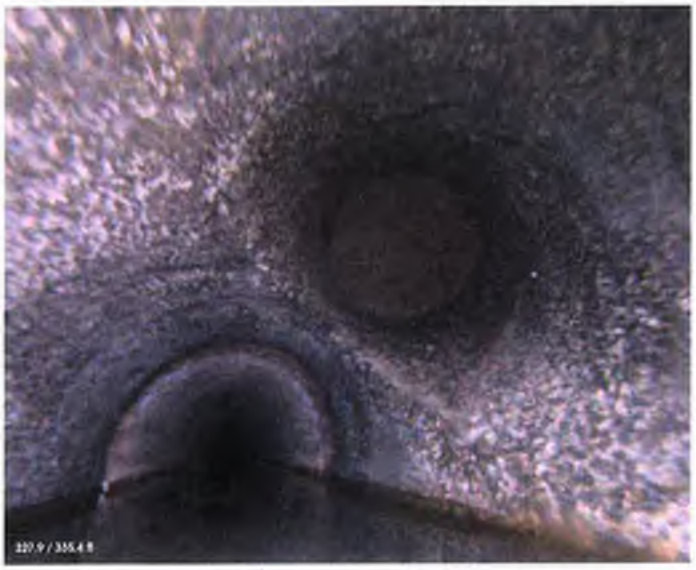
PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**d3d31441-b075-4014-900d-31d77282c270_299.2-FL.jpg**		
Distance (ft):	**299.2**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**037ab15a-c1e2-4ac2-984a-3d940965d52c_300.3-MGP.jpg**		
Distance (ft):	**300.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**c9db43d7-c83c-4fac-9ace-305e5bd274a0_308.4-FL.jpg**		
Distance (ft):	**308.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**3**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**a908b1c8-a732-4bb2-8ec9-221f144d0570_317.5-FL.jpg**		
Distance (ft):	**317.5**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MMC		
Description:	**Material Change**		
Image Name:	**8e686fb7-b131-4171-85a6-96043bb77999_326.7-MMC.jpg**		
Distance (ft):	**326.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	TFC		
Description:	**Tap Factory Capped**		
Image Name:	**687a454d-20aa-4b75-ab50-00b58ba360ea_327.9-TFC.jpg**		
Distance (ft):	**327.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**b93f2576-3b5f-4c4b-b93f-4020f8a13266_327.9-MMC.jpg**		
Distance (ft):	**327.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**cc5d9b50-d48a-4ba7-8d94-3b6697175ad2_335.4-SAP.jpg**		
Distance (ft):	**335.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:	**F01**	Within 8" of Joint:	☐
Remarks:			

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-3001 to 07-0007	07-3001	07-0007	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		245	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
N Bear Mt Alley	City of Arvin	Alley	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	04:17 PM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		245
Media Label	Reverse Setup	Work Order No	Additional Info	
NS6-1462	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
161	159	2
Overall Index	Structural Index	Maintenance Index
2.98	3	2
Overall Quick	Structural Quick	Maintenance Quick
413I	413I	2100

Recommendation

- Due to no CCTV, Open Trench Pipe Replacement (252 Ft)

07-0007

Camera Direction

Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 10% of cross sectional area
3	0	[SAP] Surface Aggregate Projecting from 8 to 4 o'clock NOT within 8" of joint Start
-	14.7	[MMC] Material Change Remarks: Vitrified clay
-	16.2	[TFC] Tap Factory Capped at 2 o'clock
-	18.4	[TFC] Tap Factory Capped at 10 o'clock
-	19.9	[MMC] Material Change Remarks: Concrete
-	32.2	[MWL] Water Level 5% of cross sectional area
-	50.3	[MGP] General Photo
-	64	[MMC] Material Change Remarks: Vitrified clay
-	65.3	[TFC] Tap Factory Capped at 2 o'clock
-	67.9	[TFC] Tap Factory Capped at 10 o'clock
-	69.3	[MMC] Material Change Remarks: Concrete
-	88.7	[MWL] Water Level 25% of cross sectional area
-	100.5	[MGP] General Photo
-	111.2	[MGO] General Observation Remarks: Suds. Begin using rear camera due to poor quality images fr
-	114.1	[MMC] Material Change Remarks: Vitrified clay
-	115.7	[TF] Tap Factory at 2 o'clock
2	118.2	[TFD] Tap Factory Defective at 10 o'clock NOT within 8" of joint Remarks: Fractures inside tap
-	119.3	[MMC] Material Change Remarks: Concrete
2	121.8	[SSS] Surface Spalling from 11 to 1 o'clock within 8" of joint
3	130.7	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	136.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
4	148.3	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint
-	150.1	[MGP] General Photo
-	150.9	[TB] Tap Break-in at 10 o'clock
-	166.3	[MMC] Material Change Remarks: Vitrified clay
-	167.9	[TF] Tap Factory at 2 o'clock
-	170.6	[TF] Tap Factory at 10 o'clock
-	171.3	[MMC] Material Change Remarks: Concrete
-	195.5	[TB] Tap Break-in at 10 o'clock
-	200.4	[MGP] General Photo
-	212.5	[MMC] Material Change Remarks: Vitrified clay
-	214.3	[TF] Tap Factory at 2 o'clock
-	216.9	[TF] Tap Factory at 10 o'clock
-	217.7	[MMC] Material Change Remarks: Concrete
-	227.4	[TBA] Tap Break-in Active at 1 o'clock
3	245.4	[SAP] Surface Aggregate Projecting from 8 to 4 o'clock NOT within 8" of joint End
-	245.4	[AMH] Manhole Remarks: End of survey

07-3001

Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	10% of cross sectional area				10	☐		
3	0	SAP	Surface Aggregate Projecting	from 8 to 4 o'clock NOT within 8" of joint Start	S01				☐	8	4
-	14.7	MMC	Material Change	Remarks: Vitrified clay					☐		
-	16.2	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	18.4	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	19.9	MMC	Material Change	Remarks: Concrete					☐		
-	32.2	MWL	Water Level	5% of cross sectional area				5	☐		
-	50.3	MGP	General Photo						☐		
-	64	MMC	Material Change	Remarks: Vitrified clay					☐		
-	65.3	TFC	Tap Factory Capped	at 2 o'clock		4			☐	2	
-	67.9	TFC	Tap Factory Capped	at 10 o'clock		4			☐	10	
-	69.3	MMC	Material Change	Remarks: Concrete					☐		
-	88.7	MWL	Water Level	25% of cross sectional area				25	☐		
-	100.5	MGP	General Photo						☐		
-	111.2	MGO	General Observation	Remarks: Suds. Begin using rear camera due to poor quality images from front camera. Clocking angles are from front camera point of view.					☐		
-	114.1	MMC	Material Change	Remarks: Vitrified clay					☐		
-	115.7	TF	Tap Factory	at 2 o'clock		4			☐	2	
2	118.2	TFD	Tap Factory Defective	at 10 o'clock NOT within 8" of joint Remarks: Fractures inside tap		4			☐	10	
-	119.3	MMC	Material Change	Remarks: Concrete					☐		
2	121.8	SSS	Surface Spalling	from 11 to 1 o'clock within 8" of joint					☑	11	1
3	130.7	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	136.4	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
4	148.3	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint					☑	10	2
-	150.1	MGP	General Photo						☐		
-	150.9	TB	Tap Break-in	at 10 o'clock		4			☐	10	
-	166.3	MMC	Material Change	Remarks: Vitrified clay					☐		
-	167.9	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	170.6	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	171.3	MMC	Material Change	Remarks: Concrete					☐		
-	195.5	TB	Tap Break-in	at 10 o'clock		4			☐	10	
-	200.4	MGP	General Photo						☐		
-	212.5	MMC	Material Change	Remarks: Vitrified clay					☐		
-	214.3	TF	Tap Factory	at 2 o'clock		4			☐	2	
-	216.9	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	217.7	MMC	Material Change	Remarks: Concrete					☐		
-	227.4	TBA	Tap Break-in Active	at 1 o'clock		4			☐	1	

3	245.4	SAP	Surface Aggregate Projecting	from 8 to 4 o'clock NOT within 8" of joint End	F01				☐	8	4
-	245.4	AMH	Manhole	Remarks: End of survey					☐		

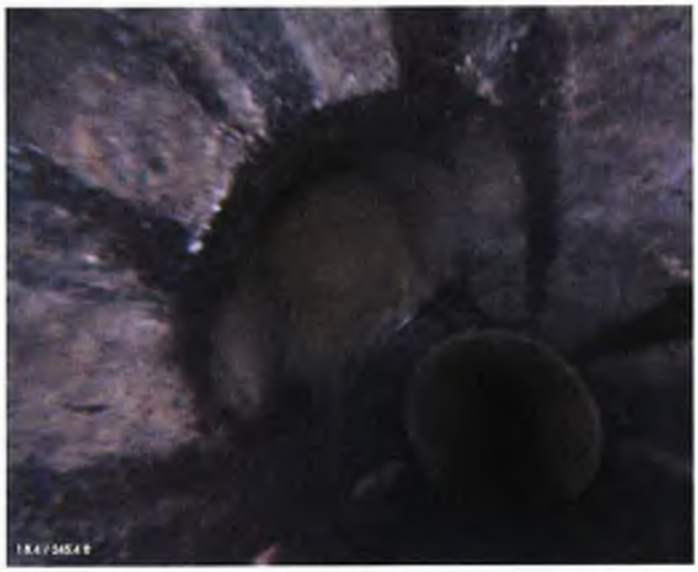
PACP Code:	AMH		
Description:	Manhole		
Image Name:	ab180a3d-ba8b-4adc-9f1e-e19902c13421_0-AMH.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Begin survey		

PACP Code:	MWL		
Description:	Water Level		
Image Name:	24614e25-58d3-4e6b-8537-93b0b5dbc602_0-MWL.jpg		
Distance (ft):	0		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**c787cd3a-d825-4cae-a4f3-43b2e7e1562f_0-SAP.jpg**		
Distance (ft):	**0**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:	**501**	Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**ea94a84b-e5e9-422b-a027-aa423d741882_14.7-MMC.jpg**		
Distance (ft):	**14.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**fd535cb2-dc32-410e-a74d-7ed46fab80fe_16.2-TFC.jpg**		
Distance (ft):	**16.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

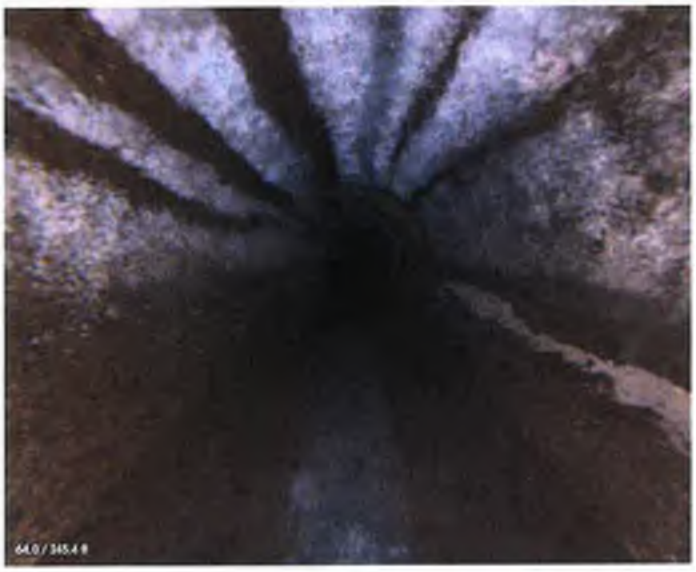


PACP Code:	TFC		
Description:	Tap Factory Capped		
Image Name:	38b99804-a6c4-4a68-a005-a738d509584d_18.4-TFC.jpg		
Distance (ft):	18.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

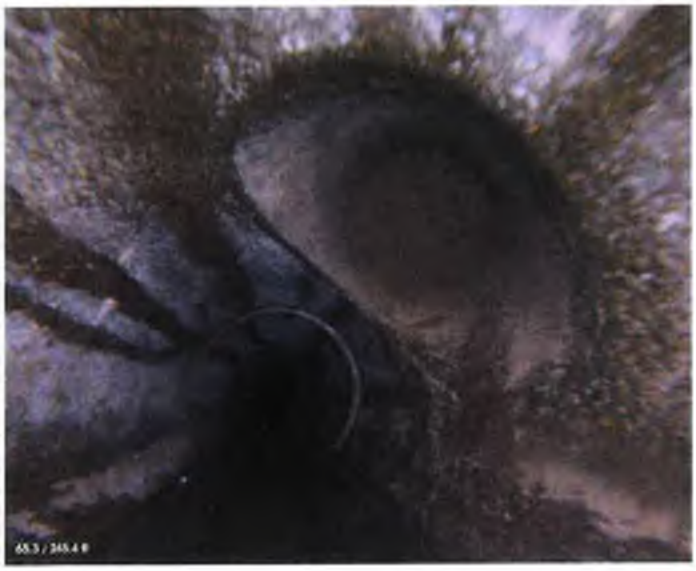
PACP Code:	MMC		
Description:	Material Change		
Image Name:	5e180db6-928f-44a2-bbf8-b6c10921dccf_19.9-MMC.jpg		
Distance (ft):	19.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		

PACP Code:	MWL		
Description:	Water Level		
Image Name:	45483e8d-a308-4d0e-bc15-844739dbac44_32.2-MWL.jpg		
Distance (ft):	32.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

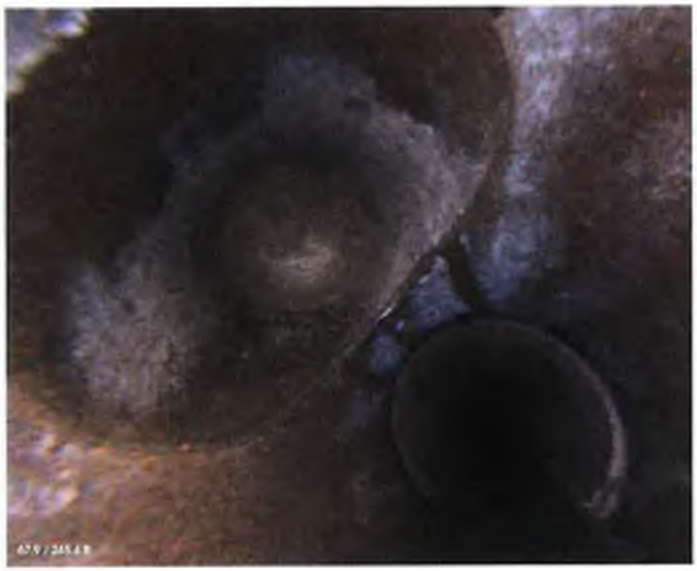
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**8f2773b5-5b63-4bdc-b29d-231c0c314553_50.3-MGP.jpg**		
Distance (ft):	**50.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**709ddb7f-d17b-49cf-ac82-499a9ca95cb8_64-MMC.jpg**		
Distance (ft):	**64**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**0230c53b-1c7e-4536-a5ff-eadfdc06888c_65.3-TFC.jpg**		
Distance (ft):	**65.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



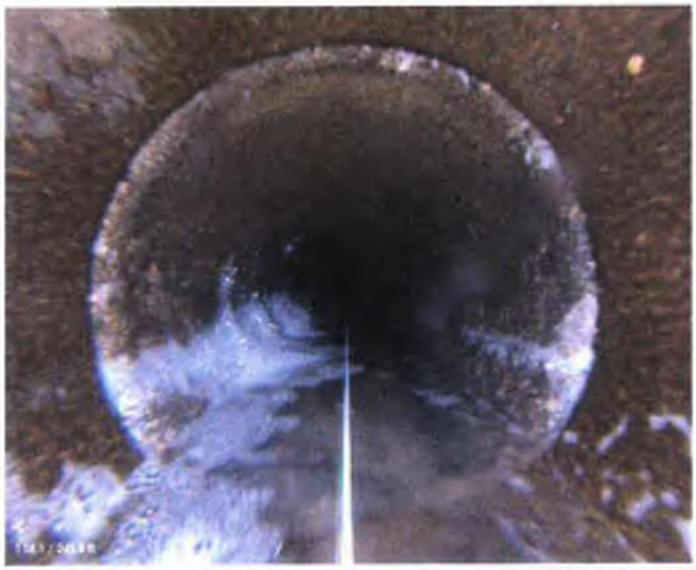
PACP Code:	**TFC**		
Description:	**Tap Factory Capped**		
Image Name:	**eaaf0979-72af-485d-b33c-44ee10f5250a_67.9-TFC.jpg**		
Distance (ft):	**67.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**370dddcf-b522-40b0-b5ea-d2798ac5a30b_69.3-MMC.jpg**		
Distance (ft):	**69.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**6272f88a-7289-4cb3-ba3a-338549555c7a_88.7-MWL.jpg**		
Distance (ft):	**88.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**25**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**ebf08bed-bc98-43e1-95c0-039055f2f15b_100.5-MGP.jpg**		
Distance (ft):	**100.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGO**		
Description:	**General Observation**		
Image Name:	**718f4628-0b98-494a-ba22-d6013f1a3022_111.2-MGO.jpg**		
Distance (ft):	**111.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Suds. Begin using rear camera due to poor quality images from front camera. Clocking angles are from front camera point of view.**		



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**0b3ef35a-b474-46bf-b6d3-943f47122d24_114.1-MMC.jpg**		
Distance (ft):	**114.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	TF		
Description:	Tap Factory		
Image Name:	aabf5fcb-9574-4d66-9fd1-a1528119ebe2_115.7-TF.jpg		
Distance (ft):	115.7		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TFD		
Description:	Tap Factory Defective		
Image Name:	42a30f69-e85a-4613-bef6-e7e67bd17721_118.2-TFD.jpg		
Distance (ft):	118.2		
Structural Grade:	0	Maintenance Grade	2
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Fractures inside tap		

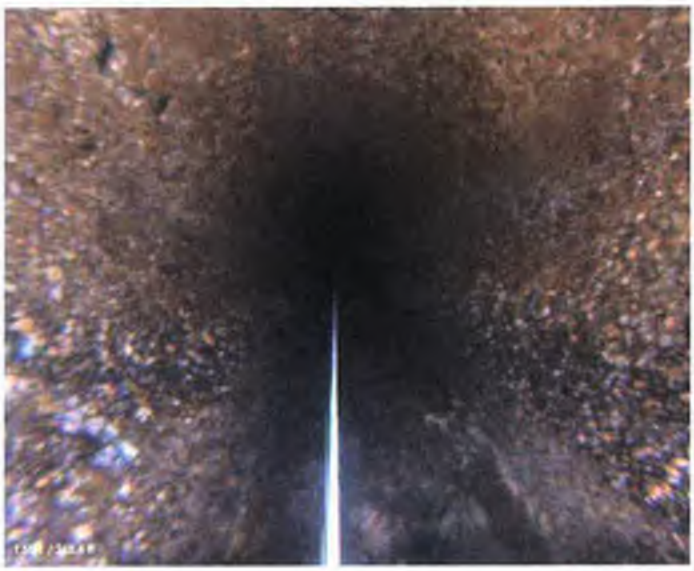
PACP Code:	MMC		
Description:	Material Change		
Image Name:	fb8b4f4d-31bc-4ef4-b6f1-00bdad9ac6b5_119.3-MMC.jpg		
Distance (ft):	119.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		

PACP Code:	SSS		
Description:	**Surface Spalling**		
Image Name:	**040dd2af-6a6f-441d-821e-32ce9b7566a9_121.8-SSS.jpg**		
Distance (ft):	**121.8**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**d472e86a-eb73-4aa7-9b89-da420172c152_130.7-FL.jpg**		
Distance (ft):	**130.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**054bcb22-11b4-480c-b580-80f3735621f2_136.4-FL.jpg**		
Distance (ft):	**136.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	aecff794-40fc-443c-8c9b-3d57c8e4d55b_148.3-FM.jpg		
Distance (ft):	148.3		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	2
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

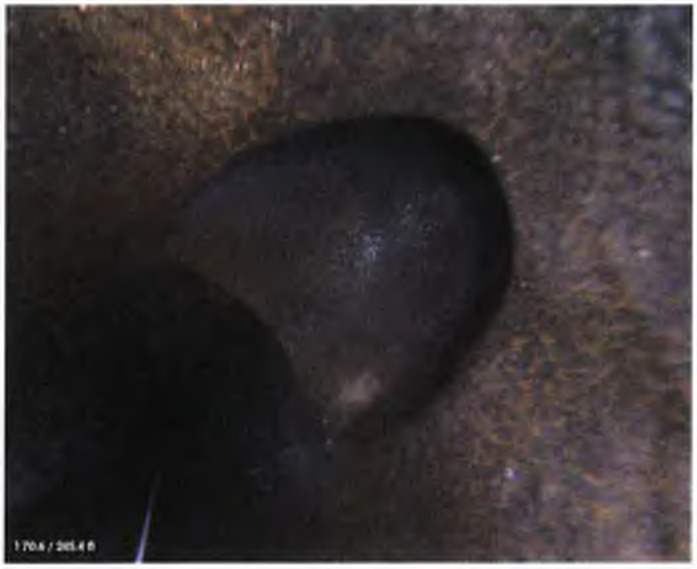


PACP Code:	MGP		
Description:	General Photo		
Image Name:	9516c828-4e5b-4dcc-8ff1-d88d73392d26_150.1-MGP.jpg		
Distance (ft):	150.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	1f3c4e0d-8102-42cf-a353-d15abecd74b1_150.9-TB.jpg		
Distance (ft):	150.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	34eb35d7-b06a-472f-8cc4-2eb8e2087e18_166.3-MMC.jpg		
Distance (ft):	166.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Vitrified clay		

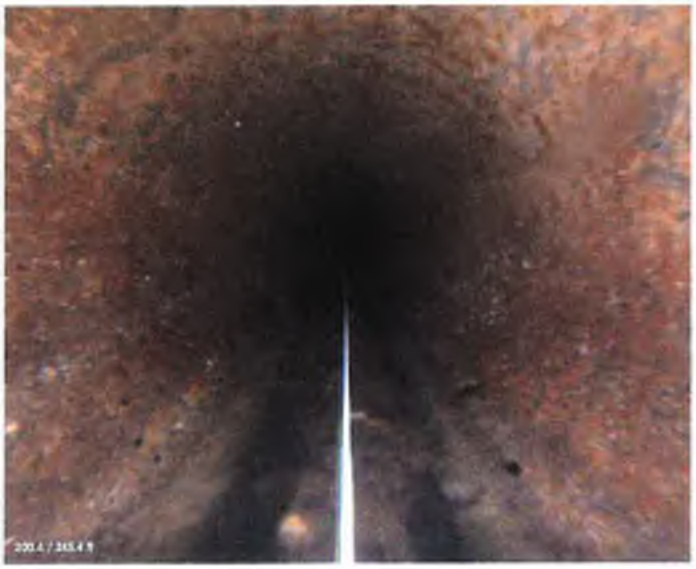
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	f6df77c9-3aed-47c2-b631-53e4e23f4f58_167.9-TF.jpg		
Distance (ft):	167.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	2	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



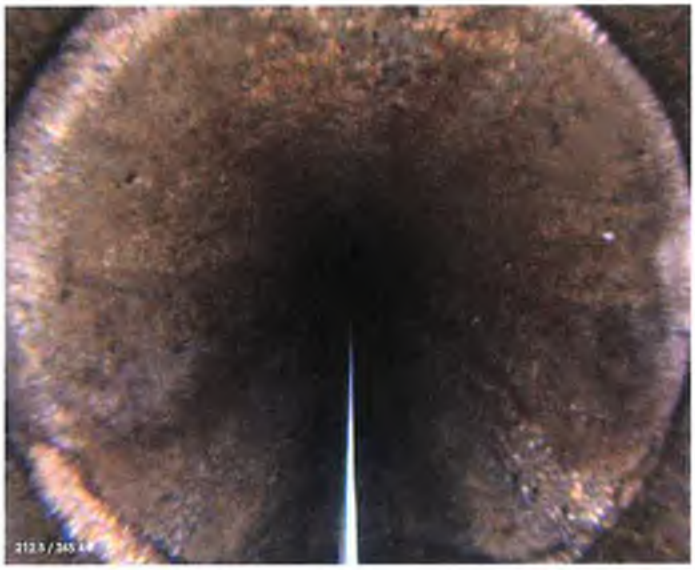
PACP Code:	TF		
Description:	Tap Factory		
Image Name:	7b3ce247-0808-41f9-b2c7-2048bbf94a3f_170.6-TF.jpg		
Distance (ft):	170.6		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**3489941d-e79d-4d28-b35b-946dfdd8fab1_171.3-MMC.jpg**		
Distance (ft):	**171.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

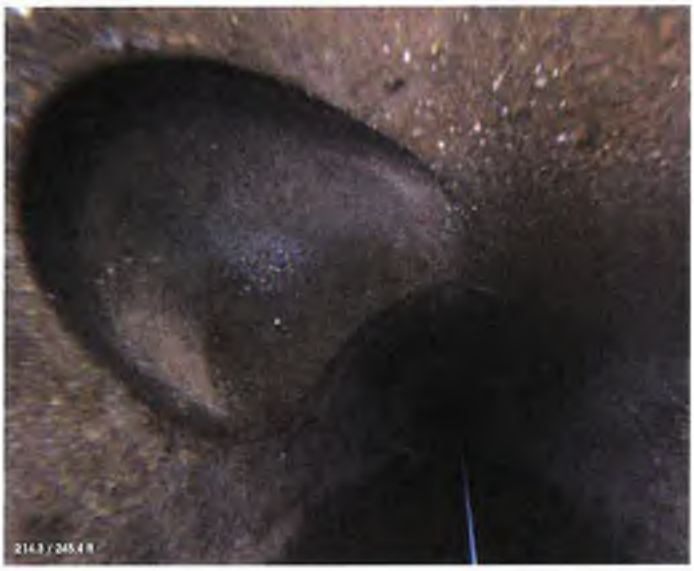
PACP Code:	**TB**		
Description:	**Tap Break-in**		
Image Name:	**2c9a6642-27d0-4d73-a793-8b41761b4a62_195.5-TB.jpg**		
Distance (ft):	**195.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



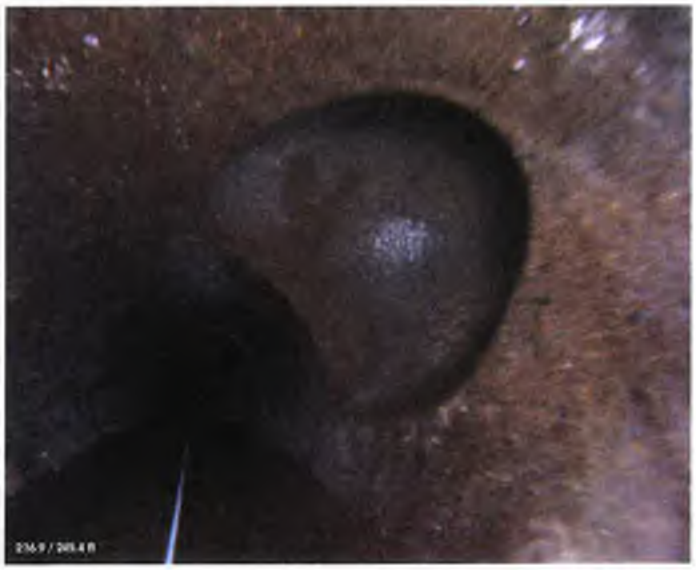
PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**0865dab5-a3bf-4fdf-830b-6d092cf4b583_200.4-MGP.jpg**		
Distance (ft):	**200.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**b56f9e99-5fd4-4759-8f4b-955648870b57_212.5-MMC.jpg**		
Distance (ft):	**212.5**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**395b4b59-245a-43b0-80cf-4409bbddb4a6_214.3-TF.jpg**		
Distance (ft):	**214.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**TF**		
Description:	**Tap Factory**		
Image Name:	**33f02fa9-c3bd-455e-a15b-7fed69161e24_216.9-TF.jpg**		
Distance (ft):	**216.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**92e629c9-869b-41bf-9991-b1a20634c449_217.7-MMC.jpg**		
Distance (ft):	**217.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	**TBA**		
Description:	**Tap Break-in Active**		
Image Name:	**3ec98d0d-c5ae-4d0f-b173-574912f42132_227.4-TBA.jpg**		
Distance (ft):	**227.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**c228dd53-78d6-48b2-8735-3324e86b4f91_245.4-SAP.jpg**		
Distance (ft):	**245.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:	**F01**	Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**f773d656-e009-4bba-9981-9e4587d64282_245.4-AMH.jpg**		
Distance (ft):	**245.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
07-0007 to 07-0006	07-0007	07-0006	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		160	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
N. Bear	City of Arvin	Light Highway	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	11/30/2010	04:23 PM	Downstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		160
Media Label	Reverse Setup	Work Order No	Additional Info	
NS15-1526	NO	-		

Results:

Overall Rating	Structural Rating	Maintenance Rating
150	150	0
Overall Index	Structural Index	Maintenance Index
3.06	3.06	0
Overall Quick	Structural Quick	Maintenance Quick
433H	433H	0000

- J56.5 - 68 Spot Repair
- J92 Props
- J101 -> J110 -> J121 -> J133 -> J136

- Lining of the pipe needs to be improved
- Water Level stayed relativly low until the end
- Analysis of the joints show drops in various of the segments

Recommendation

① Open Trench Pipe Replacement (160ft)

②

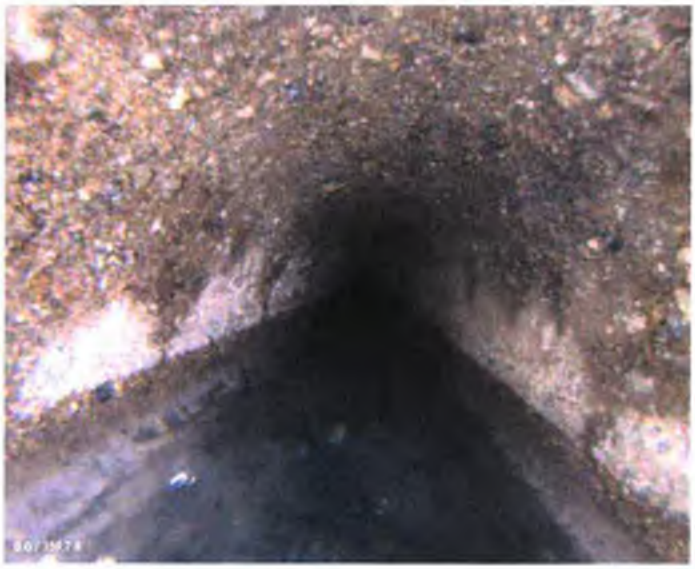
Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 25% of cross sectional area
3	0	[SAP] Surface Aggregate Projecting from 7 to 5 o'clock NOT within 8" of joint Start
3	9.9	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint Start J (10 - 13)
3	27.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint End
-	33.8	[MMC] Material Change Remarks: Vitrified clay
-	34.1	[TFC] Tap Factory Capped at 11 o'clock
-	36	[MMC] Material Change Remarks: Concrete
3	45	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	50.4	[MGP] General Photo
3	65.6	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	71.7	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	77.3	[MMC] Material Change Remarks: Vitrified clay
-	78.1	[TBA] Tap Break-in Active at 2 o'clock
-	79.9	[MMC] Material Change Remarks: Concrete
3	91.4	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
-	100.6	[MGP] General Photo
4	112.3	[FM] Fracture Multiple from 11 to 2 o'clock within 8" of joint
3	118.5	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
4	124.4	[FM] Fracture Multiple from 10 to 2 o'clock within 8" of joint
-	124.4	[MMC] Material Change Remarks: Vitrified clay
-	124.9	[TF] Tap Factory at 10 o'clock
-	126.8	[MMC] Material Change Remarks: Concrete
3	126.8	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	132.8	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
4	138.6	[FM] Fracture Multiple from 11 to 1 o'clock within 8" of joint
3	144.7	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint JI45 - MH - Replace
3	147.5	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint
-	150.2	[MGP] General Photo
3	153.6	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
3	159.7	[SAP] Surface Aggregate Projecting from 7 to 5 o'clock NOT within 8" of joint End
-	159.7	[AMH] Manhole Remarks: End of survey

Condition Observations:

Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	25% of cross sectional area				25	☐		

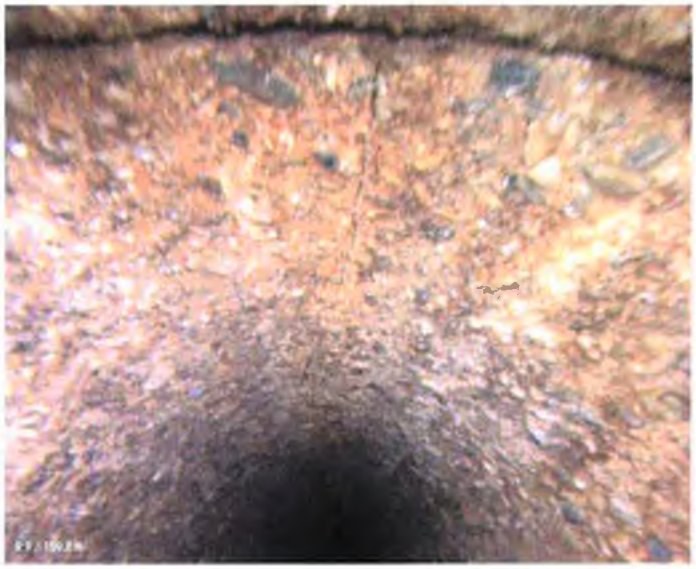
3	0	SAP	Surface Aggregate Projecting	from 7 to 5 o'clock NOT within 8" of joint Start	S01				☐	7	5
3	9.9	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint Start	S02				☑	12	
3	27.4	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint End	F02				☑	12	
-	33.8	MMC	Material Change	Remarks: Vitrified clay					☐		
-	34.1	TFC	Tap Factory Capped	at 11 o'clock		4			☐	11	
-	36	MMC	Material Change	Remarks: Concrete					☐		
3	45	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	50.4	MGP	General Photo						☐		
3	65.6	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	71.7	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	77.3	MMC	Material Change	Remarks: Vitrified clay					☐		
-	78.1	TBA	Tap Break-in Active	at 2 o'clock		4			☐	2	
-	79.9	MMC	Material Change	Remarks: Concrete					☐		
3	91.4	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	100.6	MGP	General Photo						☐		
4	112.3	FM	Fracture Multiple	from 11 to 2 o'clock within 8" of joint					☑	11	2
3	118.5	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
4	124.4	FM	Fracture Multiple	from 10 to 2 o'clock within 8" of joint					☑	10	2
-	124.4	MMC	Material Change	Remarks: Vitrified clay					☐		
-	124.9	TF	Tap Factory	at 10 o'clock		4			☐	10	
-	126.8	MMC	Material Change	Remarks: Concrete					☐		
3	126.8	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	132.8	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
4	138.6	FM	Fracture Multiple	from 11 to 1 o'clock within 8" of joint					☑	11	1
3	144.7	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
3	147.5	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
-	150.2	MGP	General Photo						☐		
3	153.6	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
3	159.7	SAP	Surface Aggregate Projecting	from 7 to 5 o'clock NOT within 8" of joint End	F01				☐	7	5
-	159.7	AMH	Manhole	Remarks: End of survey					☐		

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**48f20fac-22f5-4c51-a5f2-a008170242e7_0-AMH.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Begin survey**		



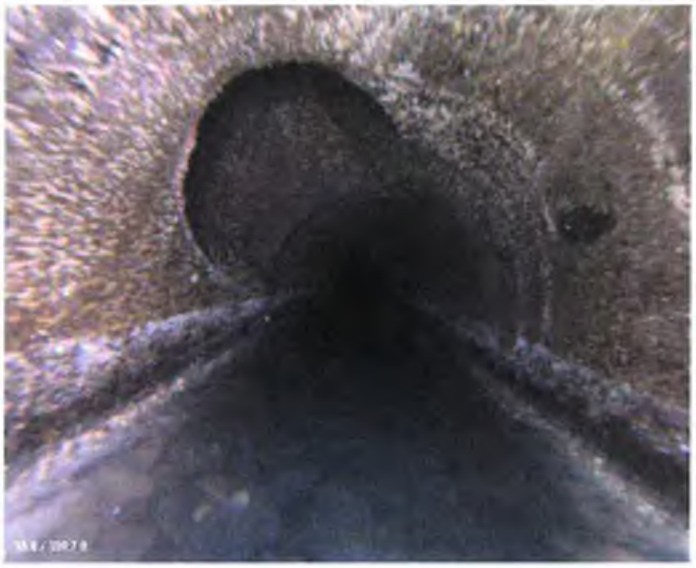
PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**1256faa2-bc96-47a4-b5f2-7c4d7d0f16a5_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**25**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**b34259d2-584c-45ae-a4e9-bb4b4ff09aed_0-SAP.jpg**		
Distance (ft):	**0**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**7**	Clock To:	**5**
1st Value:		2nd Value:	
Continuous Index:	**S01**	Within 8" of Joint:	☐
Remarks:			

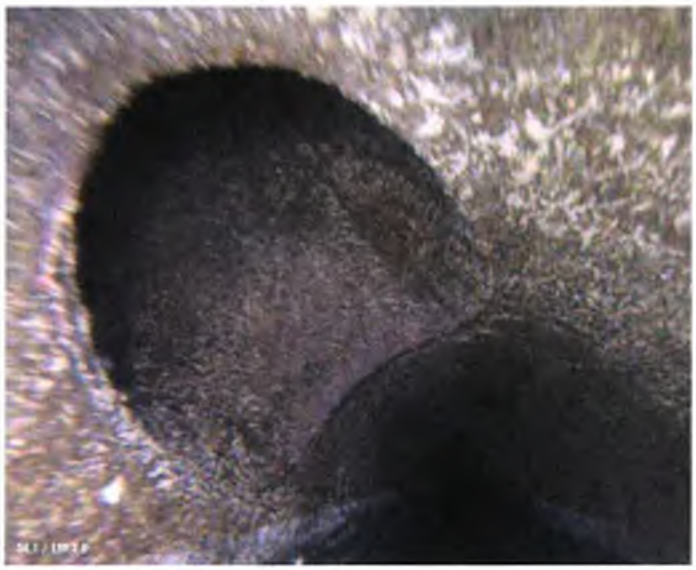


PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**ce54b641-4fd8-4201-ace4-36ad7c323700_9.9-FL.jpg**		
Distance (ft):	**9.9**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:	**S02**	Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**d340ca44-d22d-48e4-89fb-03564ab5d0f2_27.4-FL.jpg**		
Distance (ft):	**27.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:	**F02**	Within 8" of Joint:	☑
Remarks:			



PACP Code:	MMC		
Description:	**Material Change**		
Image Name:	**101f6f58-c1df-4758-b540-92719b038c90_33.8-MMC.jpg**		
Distance (ft):	**33.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

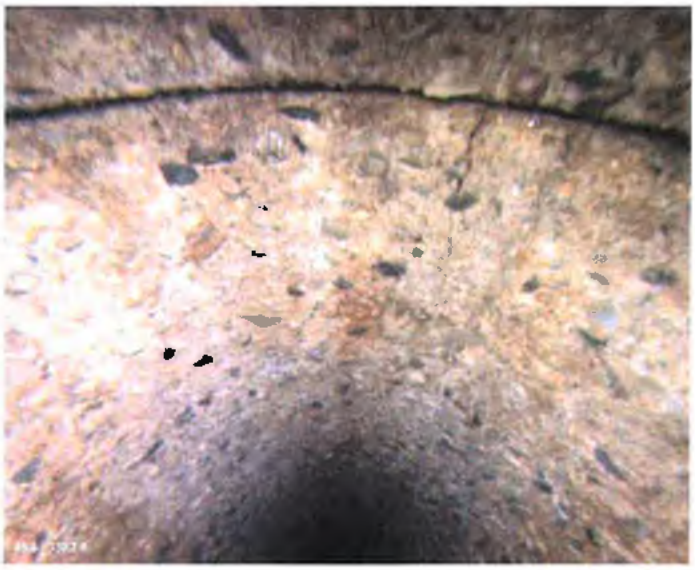


PACP Code:	TFC		
Description:	**Tap Factory Capped**		
Image Name:	**507e2b78-671c-45e6-a003-6d4e5dd165f0_34.1-TFC.jpg**		
Distance (ft):	**34.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

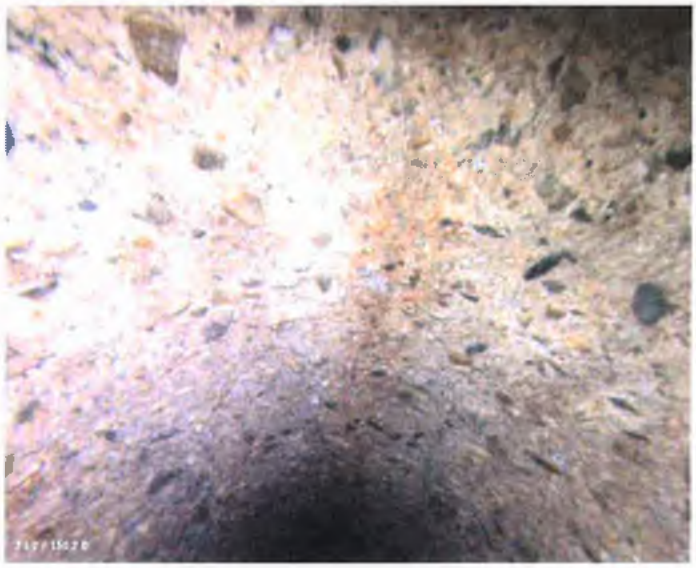
PACP Code:	MMC		
Description:	**Material Change**		
Image Name:	**c34561af-0dcf-4d15-ae11-0ea8ed106155_36-MMC.jpg**		
Distance (ft):	**36**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**febbaa5b-0970-426d-82ba-d0627233640d_45-FL.jpg**		
Distance (ft):	**45**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	242c49f3-b0cd-48a9-baa3-3d65426aca7a_50.4-MGP.jpg		
Distance (ft):	50.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

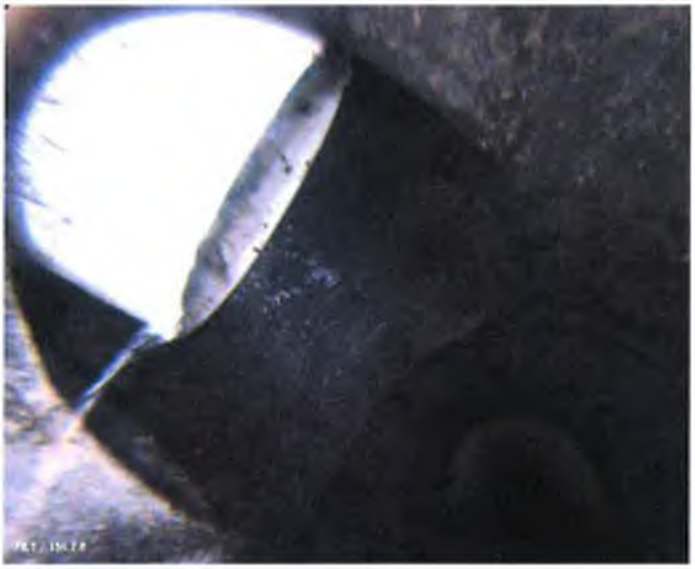


PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	aef26e7c-c7ef-4df0-ae31-f72582732a8b_65.6-FL.jpg		
Distance (ft):	65.6		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



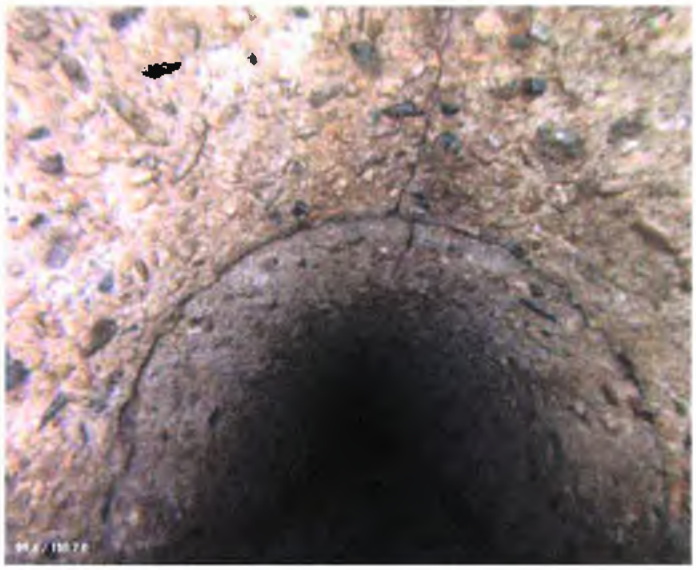
PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	bca70648-6ec3-41a6-a6b5-8cf26ffff06e_71.7-FL.jpg		
Distance (ft):	71.7		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**f7dffcb9-a4ca-411d-965f-afe17c094cdc_77.3-MMC.jpg**		
Distance (ft):	**77.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		



PACP Code:	**TBA**		
Description:	**Tap Break-in Active**		
Image Name:	**e2470f6a-8255-4a9a-b1cc-06a13b720d04_78.1-TBA.jpg**		
Distance (ft):	**78.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**2**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**45569097-0f46-4125-93e3-8c92d8a9cf86_79.9-MMC.jpg**		
Distance (ft):	**79.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**e0aed336-e67b-4ebc-9610-08efabc2b511_91.4-FL.jpg**		
Distance (ft):	**91.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**4640813d-559a-4f9a-b6de-90ee444cce61_100.6-MGP.jpg**		
Distance (ft):	**100.6**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

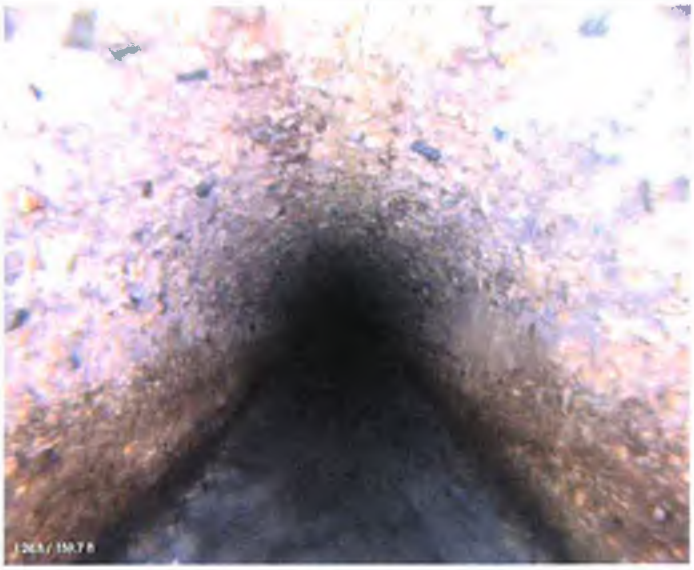
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**48de66ff-0a30-42f6-8aaa-18bc43c37290_112.3-FM.jpg**		
Distance (ft):	**112.3**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**867deb78-0e94-41bf-b765-c194b59894eb_118.5-FL.jpg**		
Distance (ft):	**118.5**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

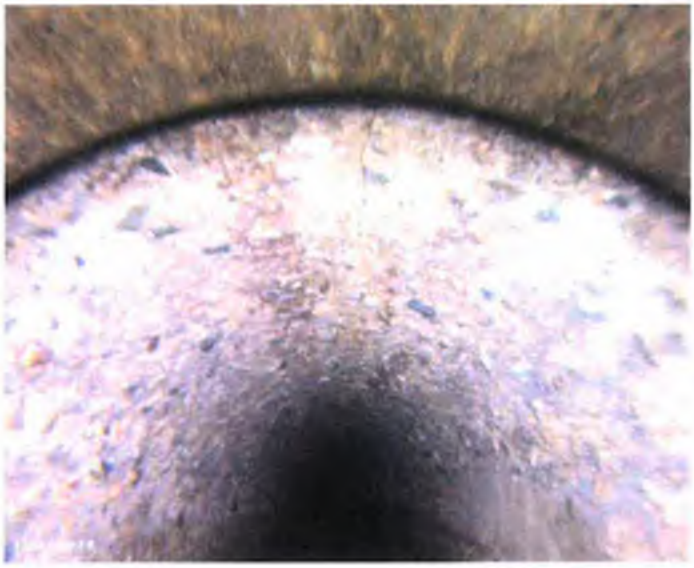
PACP Code:	**FM**		
Description:	**Fracture Multiple**		
Image Name:	**027f9baf-2d16-4fe7-9c0a-b0b3080d243d_124.4-FM.jpg**		
Distance (ft):	**124.4**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	**2**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**188a7d18-f581-431d-830e-a4cada745372_124.4-MMC.jpg**		
Distance (ft):	**124.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	TF		
Description:	**Tap Factory**		
Image Name:	**9481a66a-f8c4-4825-a913-0d1d0855fb6b_124.9-TF.jpg**		
Distance (ft):	**124.9**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**10**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

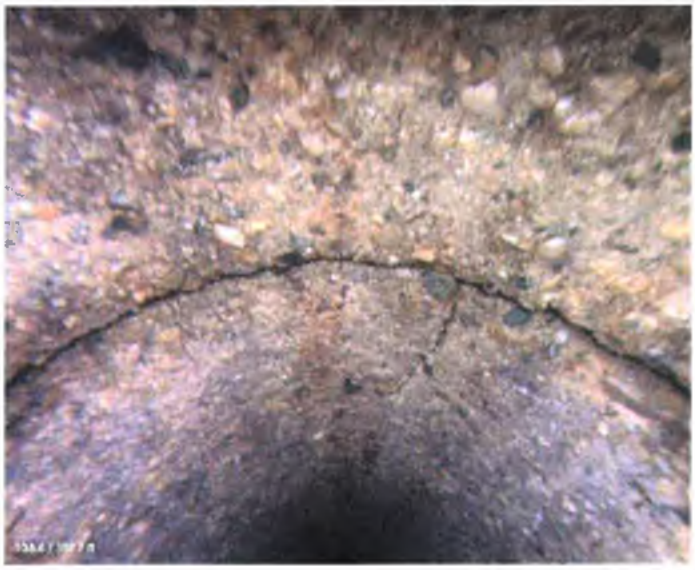


PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**4886de50-a1b0-40ec-bbd4-2d712d0ab7e6_126.8-MMC.jpg**		
Distance (ft):	**126.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Concrete**		



PACP Code:	**FL**		
Description:	**Fracture Longitudinal**		
Image Name:	**00e49b38-6dcd-4218-adac-3bd7bcdf6405_126.8-FL.jpg**		
Distance (ft):	**126.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

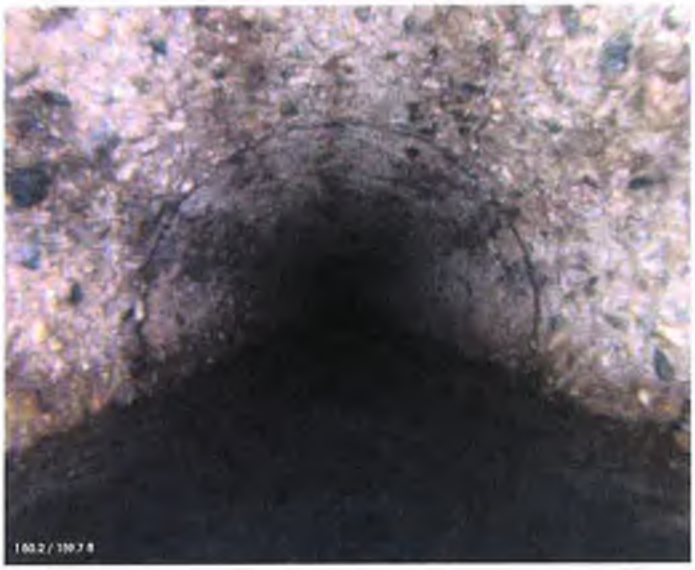
PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**084a16f0-88d9-4814-b288-075444d78214_132.8-FL.jpg**		
Distance (ft):	**132.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



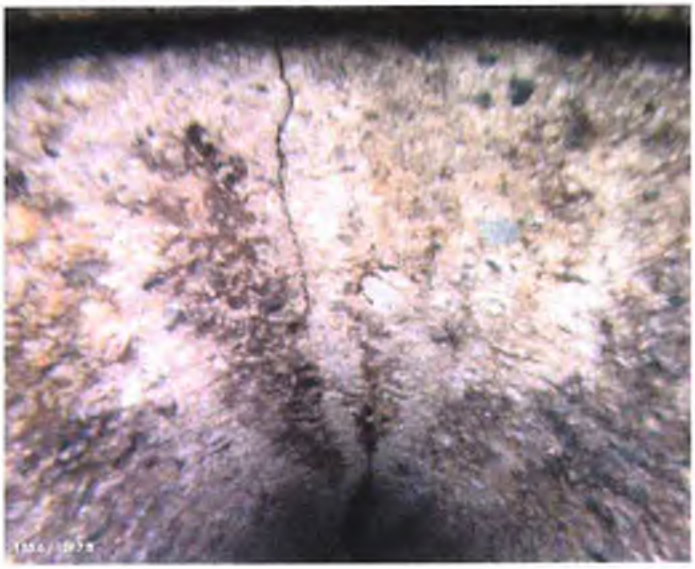
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**86906edf-5909-4653-9c0b-f91b7b49d698_138.6-FM.jpg**		
Distance (ft):	**138.6**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	**1**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**e117e597-9eba-44ea-9deb-6c3d2a5088de_144.7-FL.jpg**		
Distance (ft):	**144.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**54b6eb75-0783-4ece-a6d9-3cb06591a161_147.5-FL.jpg**		
Distance (ft):	**147.5**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**707b2961-9bc9-4aa8-a9fb-a096cc7e78e5_150.2-MGP.jpg**		
Distance (ft):	**150.2**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**301de06e-b9dd-4953-aa6f-62ae8335a7c8_153.6-FL.jpg**		
Distance (ft):	**153.6**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**12**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**9d8b0cc9-47c3-4aad-9400-d1506cba1e0f_159.7-SAP.jpg**		
Distance (ft):	**159.7**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**7**	Clock To:	**5**
1st Value:		2nd Value:	
Continuous Index:	**F01**	Within 8" of Joint:	☐
Remarks:			

PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**b9d2f92f-3d9e-45f6-8d64-0045e828f704_159.7-AMH.jpg**		
Distance (ft):	**159.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**End of survey**		

(4)

Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/27/2009	Weather:	Dry		
Pipe Length (ft):	0	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12016	Surveyor:	JJC	PSR:	07-0006 to 07-0005
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	Plum Tree St.	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Light Highway	Tape/Media #:	NS11-1192
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Reinforced Concrete Pipe
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Upstream

US MH: 07-0006 DS MH: 07-0005 Total Length Surveyed (ft): 44

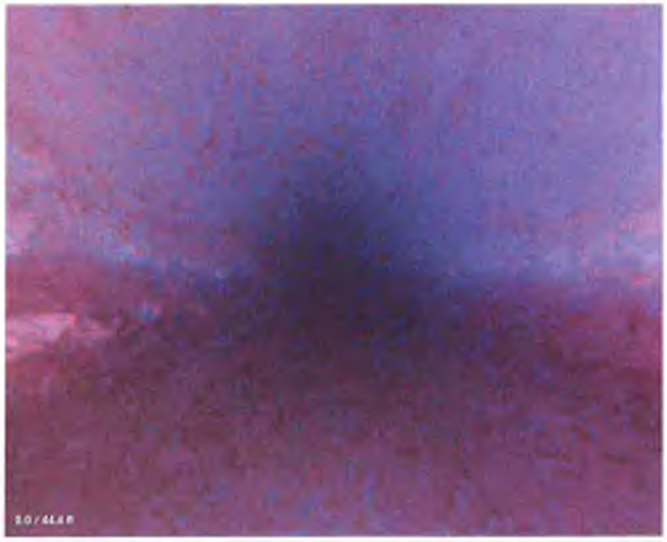
Position	Code	Observation	Video (sec)	Grade
0	AMH	Manhole	5	NA
0	MWL	Water Level	13	NA
1.55	MGO	General Observation	24	NA
11.95	MCU	Camera Underwater	53	M 4
44.41	DAGS	Deposits Attached Grease	126	M 3
44.41	MSA	Abandoned Survey	135	NA

above water at 25'

- ~~Recommendation~~
- Recommendation

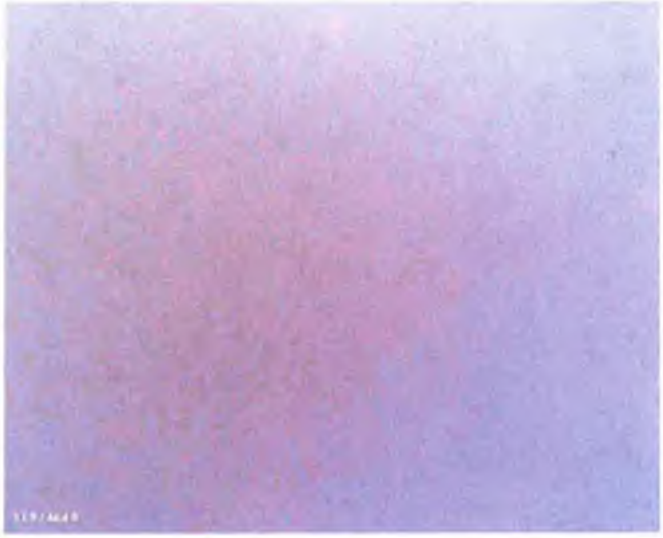
① Open Trench Pipe Replacement (because of abandonment)

PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey



PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGO
Description:	General Observation
Distance (ft):	1.55
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Lens is fogged



PACP Code:	MCU
Description:	Camera Underwater
Distance (ft):	11.95
Structural Grade:	NA
O&M Grade:	4
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	DAGS
Description:	Deposits Attached Grease
Distance (ft):	44.41
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	9
Clock To:	12
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MSA
Description:	Abandoned Survey
Distance (ft):	44.41
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Blockage by grease deposits

Profile/Photo Observation Report

RedZone ROBOTICS

Date:	10/27/2009	Weather:	Dry		
Pipe Length (ft):	0	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12016	Surveyor:	JJC	PSR:	07-0005 to 07-0004
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	Plum Tree St.	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Light Highway	Tape/Media #:	NS9-832
Purpose:	Not Known	Dia/Height (in):	8
Use:	Sanitary	Material:	Polyvinyl Chloride
Drain Area:		Lining:	
Category:			
Comment:			
Location Details:		Direction of Survey:	Downstream

US MH: 07-0005 DS MH: 07-0004 Total Length Surveyed (ft): 276

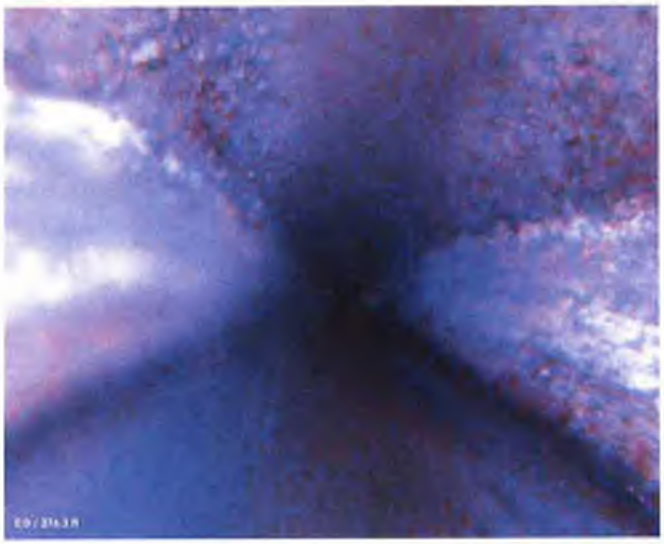
07-0005

Camera Direction

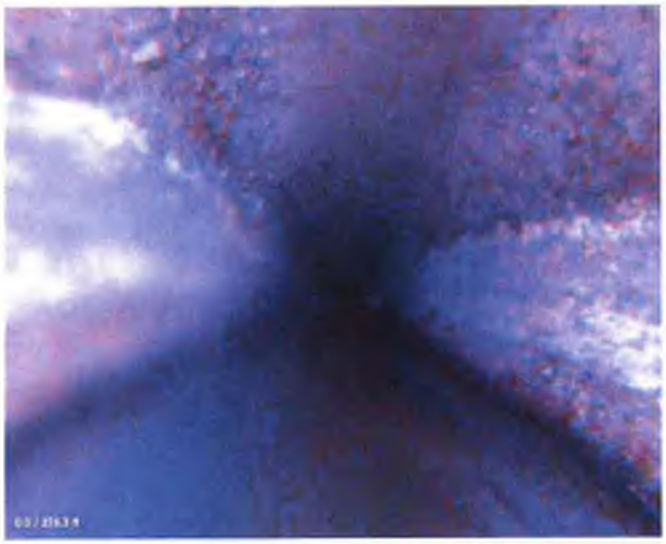
Position	Code	Observation	Video (sec)	Grade
0	AMH	Manhole	5	NA
0	MWL	Water Level (WL = 15%.)	13	NA
0.36	DAE	Deposits Attached Encrustation	22	M 3
19.33	MCU	Camera Underwater	76	M 4
25.22	MWL	Water Level 50%.	96	NA
42.67	MWL	Water Level 20%.	139	NA
49.95	MGP	General Photo	162	NA
98.26	TBA	Tap Break-in Active	267	NA
100.52	MGP	General Photo	282	NA
103.83	MWL	Water Level 50%	297	NA
104.54	DAE	Deposits Attached Encrustation	307	M 3
127.27	DAE	Deposits Attached Encrustation	360	M 3
128.4	DAE	Deposits Attached Encrustation	373	M 3
148.17	TB	Tap Break-in	422	NA
150.51	MGP	General Photo	437	NA
200.48	MGP	General Photo	545	NA
210.41	MWL	Water Level 50% WL	573	NA
222.39	DAE	Deposits Attached Encrustation	605	M 3
222.39	DAE	Deposits Attached Encrustation	615	M 3
228.43	MWL	Water Level	637	NA
245.14	MWL	Water Level 10%	679	NA
247.43	TB	Tap Break-in 10 %.	691	NA
275.15	DAE	Deposits Attached Encrustation	756	M 3
276.27	MSA	Abandoned Survey	768	NA

07-0004

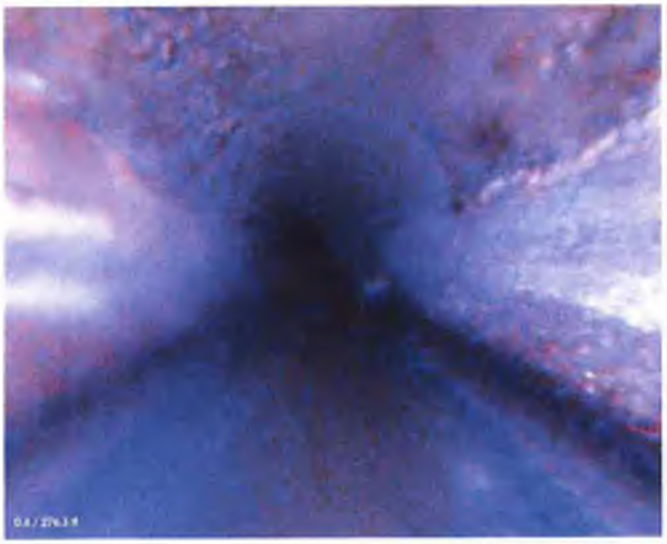
Recommendation
open Trench Replacement
340 ft (whole pipe)



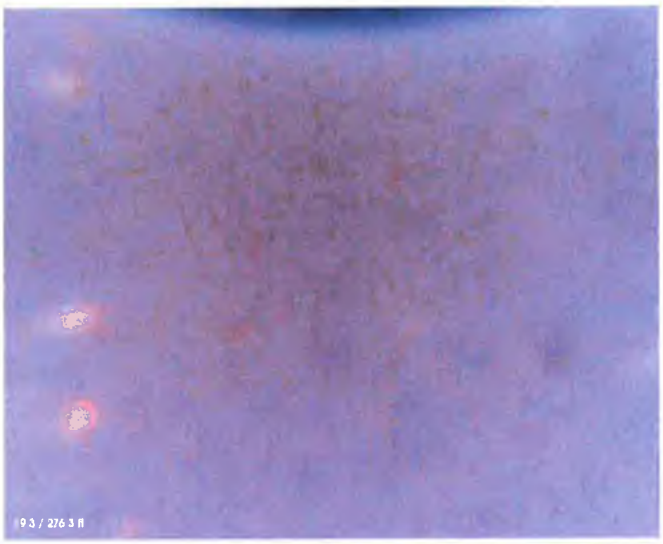
PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey



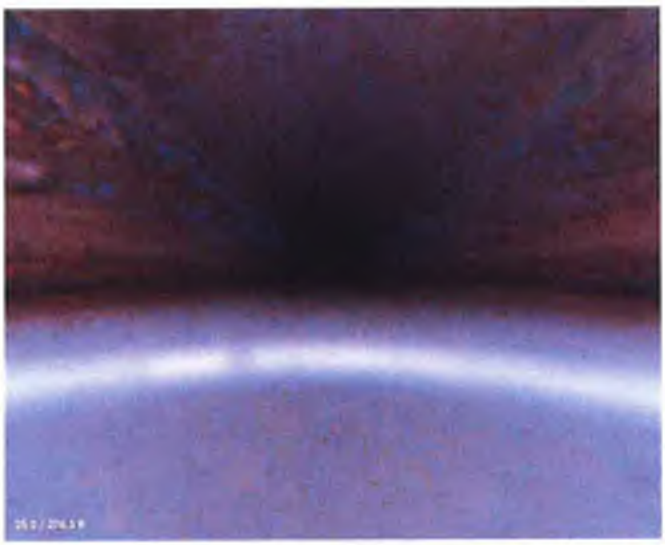
PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	0.36
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	S01
Within 8" of Joint:	False
Remarks:	

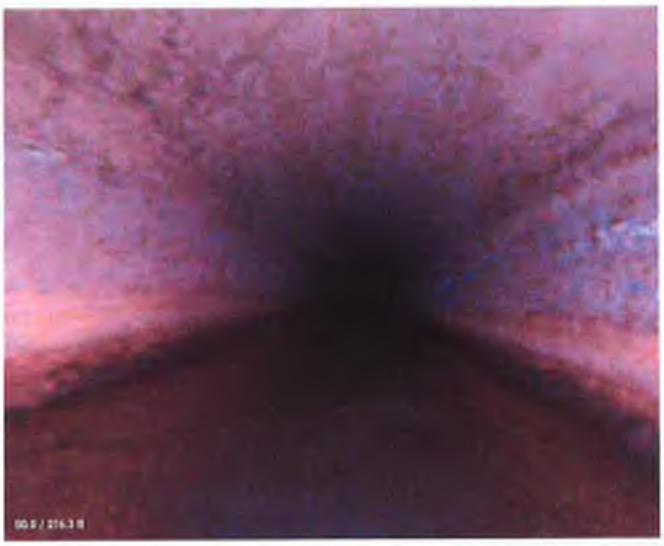


PACP Code:	MCU
Description:	Camera Underwater
Distance (ft):	19.33
Structural Grade:	NA
O&M Grade:	4
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MWL
Description:	Water Level
Distance (ft):	25.22
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

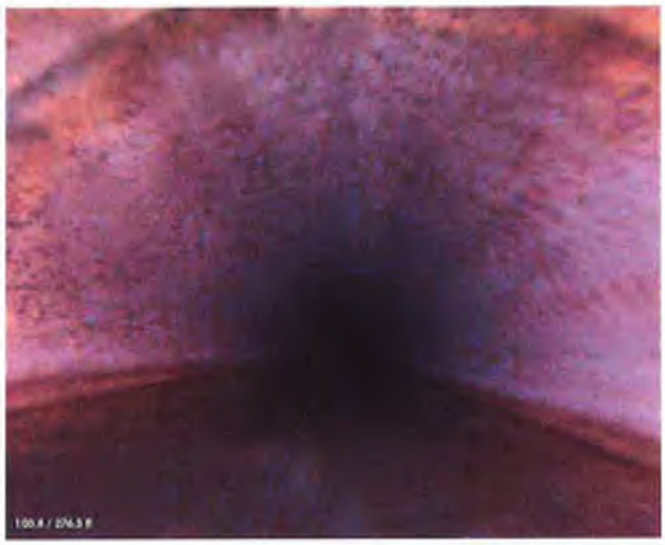
PACP Code:	MWL
Description:	Water Level
Distance (ft):	42.67
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



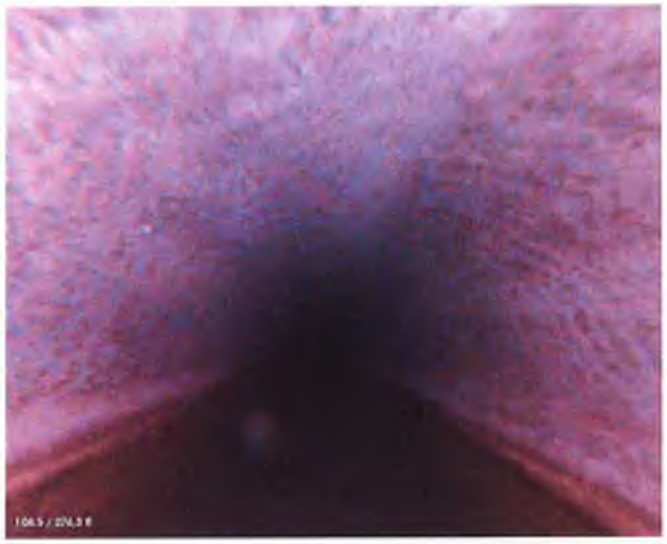
PACP Code:	MGP
Description:	General Photo
Distance (ft):	49.95
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TBA
Description:	Tap Break-in Active
Distance (ft):	98.26
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	12
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

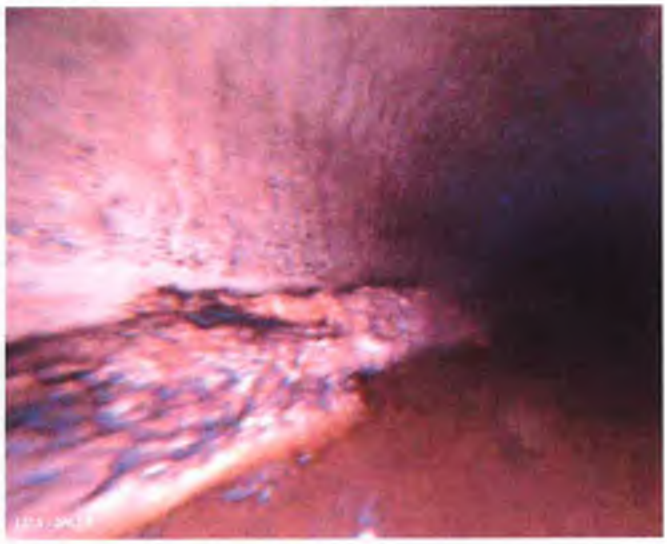
PACP Code:	MGP
Description:	General Photo
Distance (ft):	100.52
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



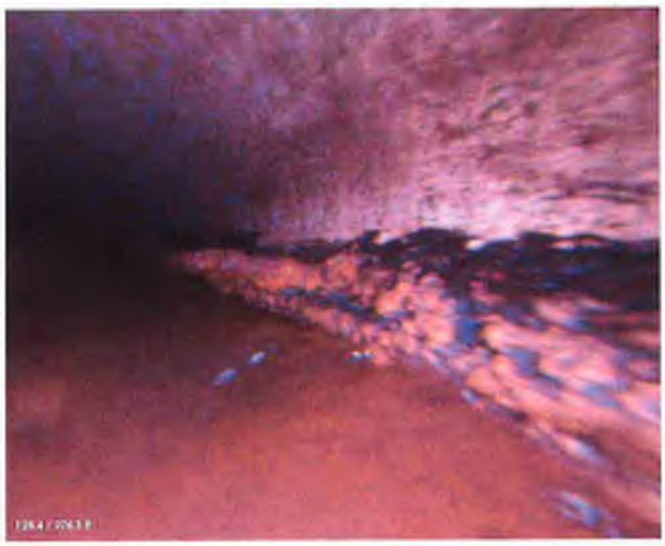
PACP Code:	MWL
Description:	Water Level
Distance (ft):	103.83
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	104.54
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	F01
Within 8" of Joint:	False
Remarks:	



PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	127.27
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	7
Clock To:	8
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



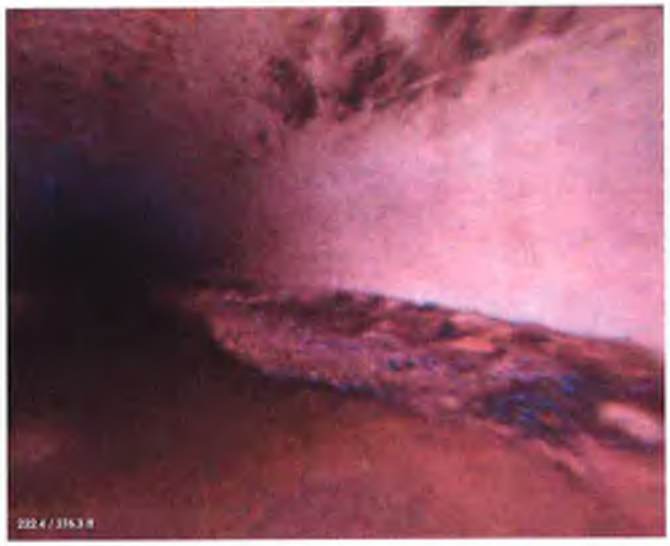
PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	128.4
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	3
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	148.17
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	9
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MGP
Description:	General Photo
Distance (ft):	150.51
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

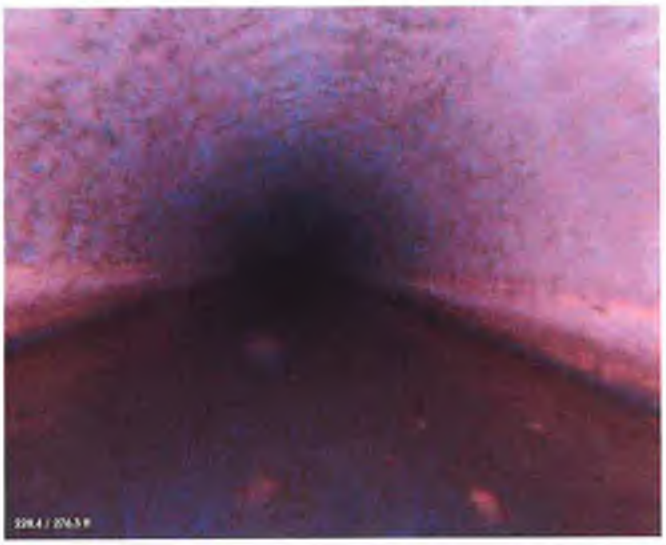
PACP Code:	MGP
Description:	General Photo
Distance (ft):	200.48
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	210.41
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



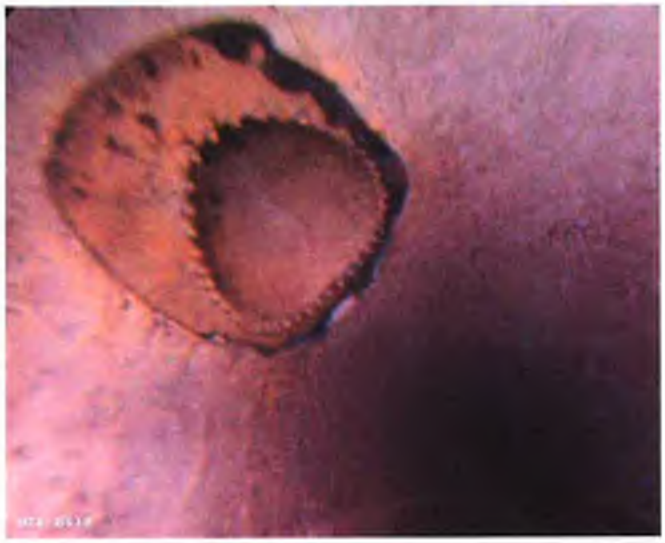
PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	222.39
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	3
Clock To:	4
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	222.39
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	8
Clock To:	9
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MWL
Description:	Water Level
Distance (ft):	228.43
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MWL
Description:	Water Level
Distance (ft):	245.14
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	247.43
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	10
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	275.15
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	8
Clock To:	9
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	MSA
Description:	Abandoned Survey
Distance (ft):	276.27
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Caught in debris

1

07-0004 to 07-0003

CCTV Observation Report

Harris & Associates

Date: 11/20/2015
Pipe Length 220
Customer:

Owner: City of Arvin
Surveyor:
Weather:

Pre Clean:
Shape: Circular
Reach: 07-0004 to 07-0003

Street:
City: Arvin
Use: Sanitary
US Manhole: 07-0004

Flow Control: unknown
Dia/Height (in): 10 or 12 (2015)
Material RCP
DS Manhole: 07-0002

Total Length Surveyed: 220 (Downstream)

Position	Code	Observation	Wideo (sec)	Grade
0	MWL	Water Level (20%)	120	NA
0		Surface Spalling	120	S3
46	TF	Tap Factory		NA
100	MGP	Water Level (20%)		NA
109		Obstruction		MZ

Observation and Recomendation

- no visible sags
- CIPP Lining Recommended for entire length

6/26

Profile/Photo Observation Report

RedZone Robotics

(1)

Date:	10/27/2009	Weather:	Dry		
Pipe Length (ft):	220	Owner:	City of Arvin	Pre Clean:	Not Known
P.O.#:	W/O # 12016	Surveyor:	JJC	PSR:	07-0004 to 07-0003
Customer:	Veolia Water NA	Clean Date:		Shape:	Circular

Street:	Campus St.	Flow Control:	Not Controlled
City:	Arvin, CA	Year Renewed:	
Location:	Light Highway	Tape/Media #:	NS23-708
Purpose:	Not Known	Dia/Height (in):	10
Use:	Sanitary	Material:	Reinforced Concrete Pipe
Drain Area:		Lining:	
Category:			
Comment:	re-run		
Location Details:		Direction of Survey:	Downstream

US MH: 07-0004 DS MH: 07-0003 Total Length Surveyed (ft): 220

Joint every 3ft

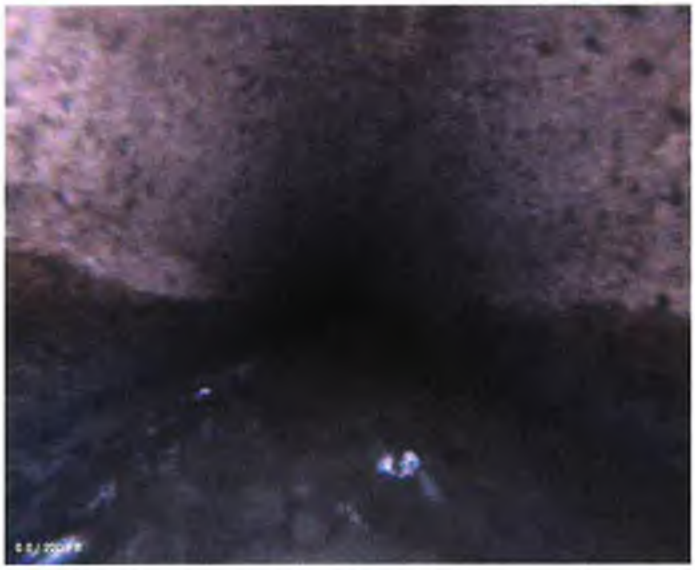
07-0004

Camera Direction

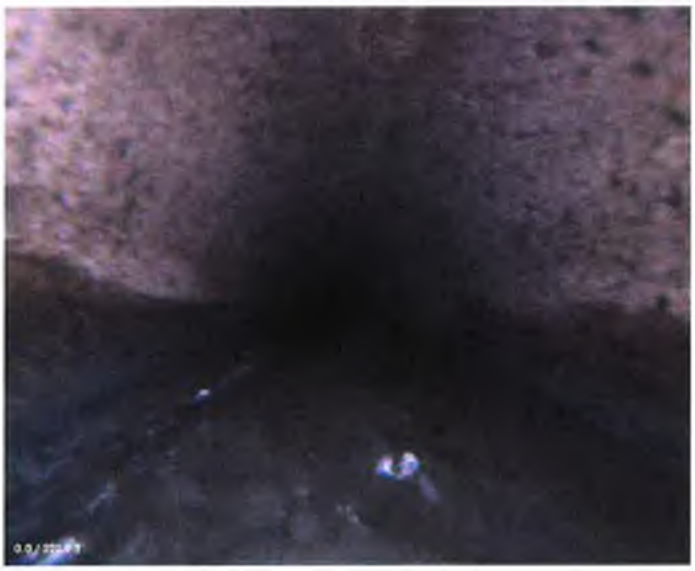
Position	Code	Observation	Video (sec)	Grade
0	AMH	Manhole	5	NA
0	MWL	Water Level	13	NA
0.48	SAV	Surface Aggregate Visible	22	S 3
11.77	MWL	Water Level ~ 50%	53	NA
15.67	MCU	Camera Underwater J14-17	69	M 4
40.6	TB	Tap Break-in J41-44	127	NA
44.94	CC	Crack Circumferential	146	S 1
50.36	MGP	General Photo wL 30%	166	NA
81.35	MWL	Water Level 40%	236	NA
100.1	MGP	General Photo	282	NA
136.69	FC	Fracture Circumferential @ Joint 136	363	S 2
150.59	MGP	General Photo	399	NA
165.63	DAE	Deposits Attached Encrustation wL 30%	437	M 3
191.82	MWL	Water Level wL 20%	498	NA
200.36	MGP	General Photo wL 20%	523	NA
206.82	MWL	Water Level wL 40%	544	NA
220.91	DAE	Deposits Attached Encrustation	581	M 3
220.91	SAV	Surface Aggregate Visible	589	S 3
220.91	AMH	Manhole	597	NA

07-0003

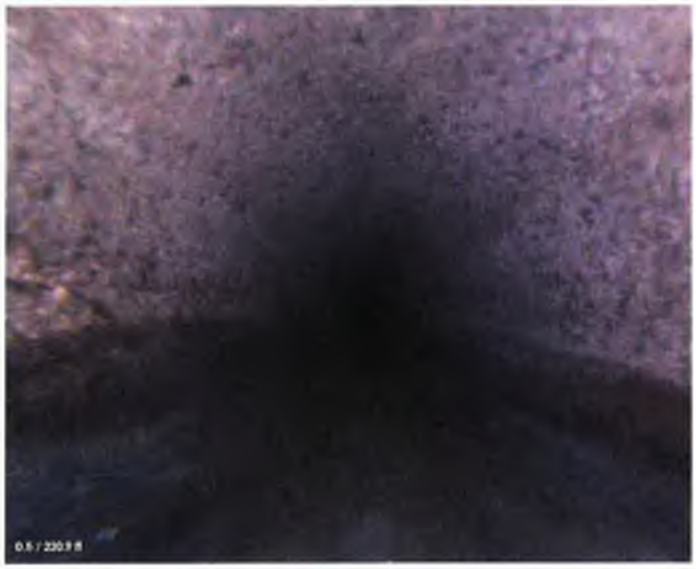
(1) Open Trench Joint 14-17 (3ft)
(2) Cleaning to remove debris
(3) CIPP entire length



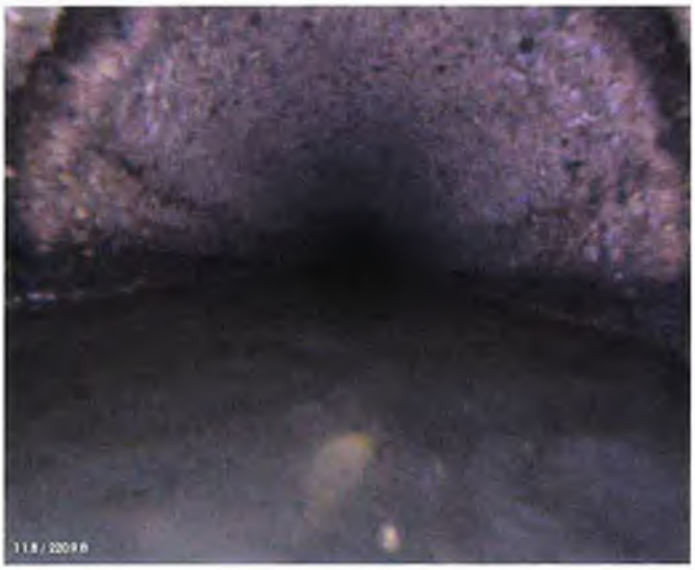
PACP Code:	AMH
Description:	Manhole
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	Begin survey



PACP Code:	MWL
Description:	Water Level
Distance (ft):	0
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

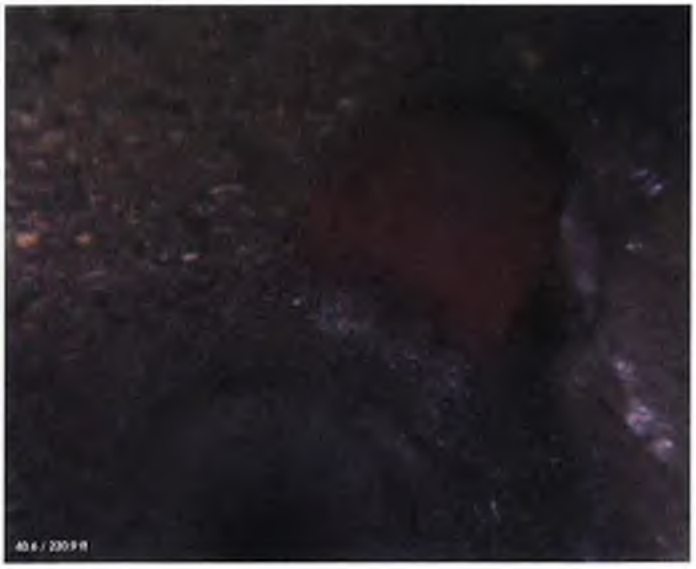


PACP Code:	SAV
Description:	Surface Aggregate Visible
Distance (ft):	0.48
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	S01
Within 8" of Joint:	False
Remarks:	

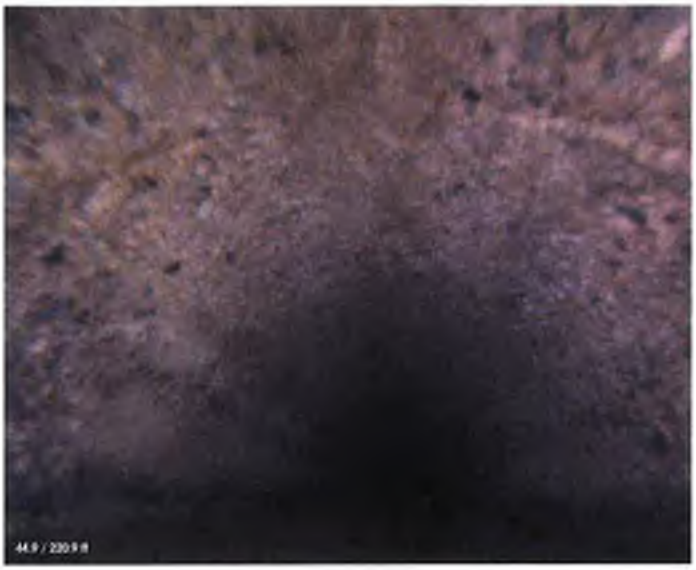


PACP Code:	MWL
Description:	Water Level
Distance (ft):	11.77
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

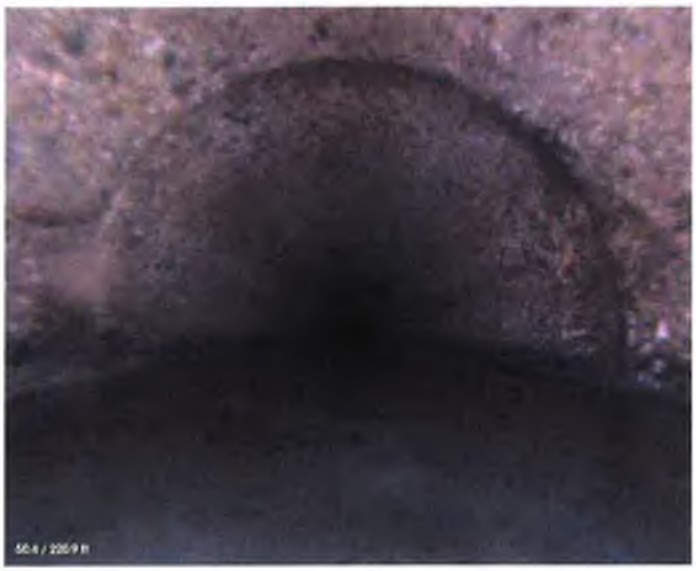
PACP Code:	MCU
Description:	Camera Underwater
Distance (ft):	15.67
Structural Grade:	NA
O&M Grade:	4
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	TB
Description:	Tap Break-in
Distance (ft):	40.6
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	1
Clock To:	
1st Value:	4
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

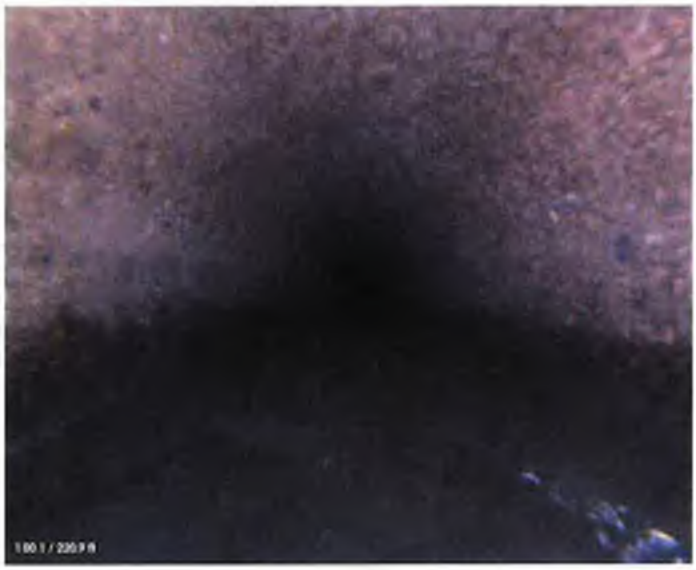


PACP Code:	CC
Description:	Crack Circumferential
Distance (ft):	44.94
Structural Grade:	1
O&M Grade:	NA
Clock Start/From:	9
Clock To:	3
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



PACP Code:	MGP
Description:	General Photo
Distance (ft):	50.36
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

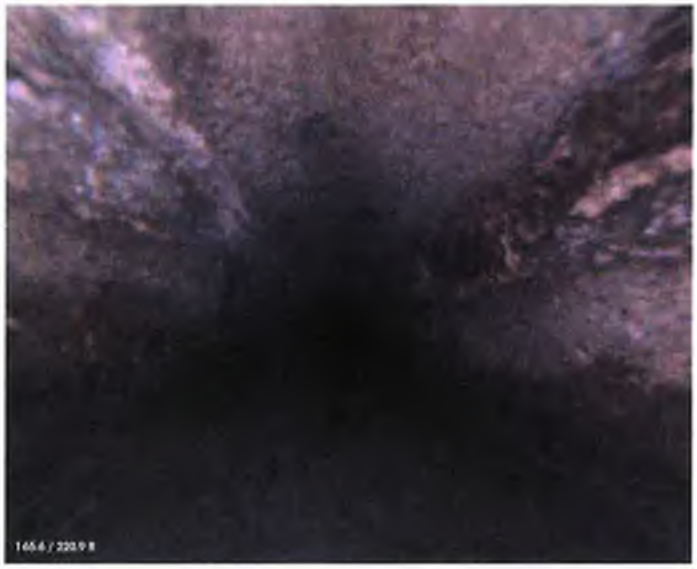
PACP Code:	MWL
Description:	Water Level
Distance (ft):	81.35
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



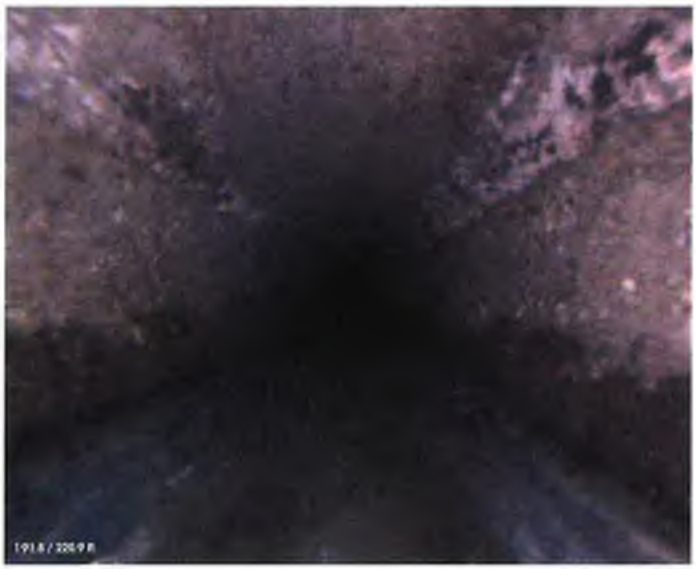
PACP Code:	MGP
Description:	General Photo
Distance (ft):	100.1
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	FC
Description:	Fracture Circumferential
Distance (ft):	136.69
Structural Grade:	2
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

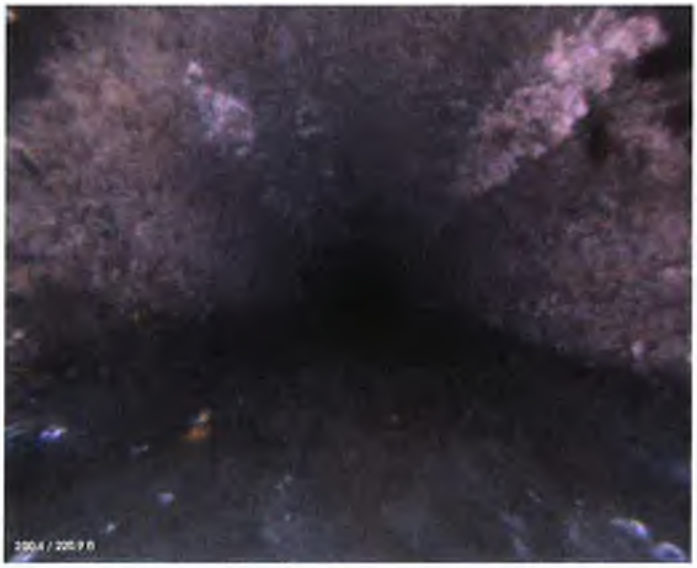
PACP Code:	MGP
Description:	General Photo
Distance (ft):	150.59
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	



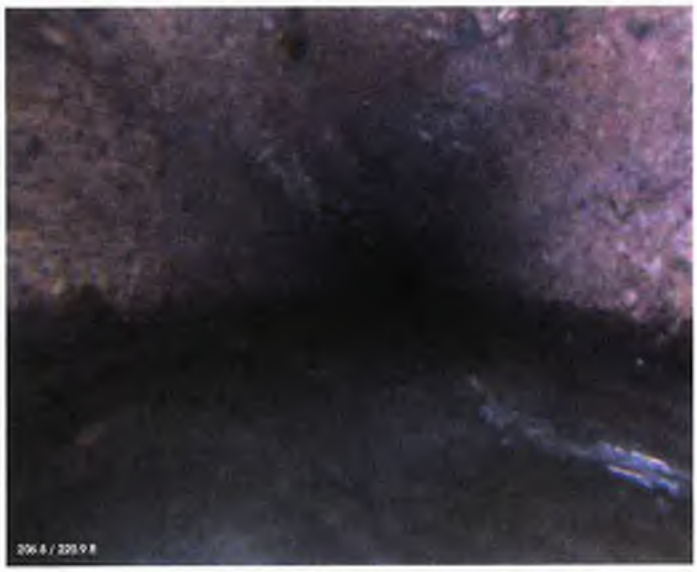
PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	165.63
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	10
Clock To:	2
1st Value:	
2nd Value:	
Continuous Index:	S02
Within 8" of Joint:	False
Remarks:	



PACP Code:	MWL
Description:	Water Level
Distance (ft):	191.82
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

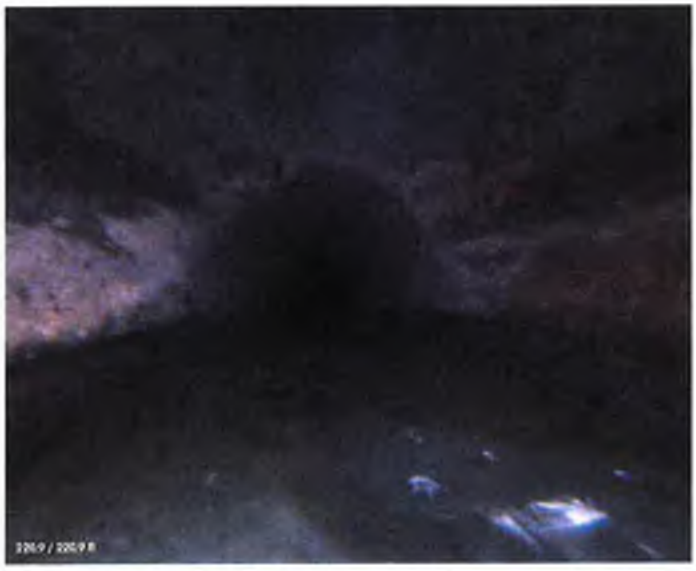


PACP Code:	MGP
Description:	General Photo
Distance (ft):	200.36
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

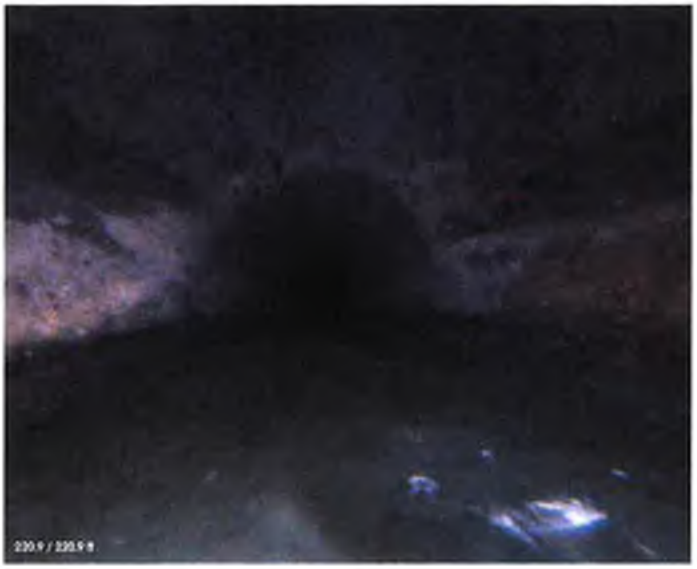


PACP Code:	MWL
Description:	Water Level
Distance (ft):	206.82
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	

PACP Code:	DAE
Description:	Deposits Attached Encrustation
Distance (ft):	220.91
Structural Grade:	NA
O&M Grade:	3
Clock Start/From:	10
Clock To:	2
1st Value:	
2nd Value:	
Continuous Index:	F02
Within 8" of Joint:	False
Remarks:	



PACP Code:	SAV
Description:	Surface Aggregate Visible
Distance (ft):	220.91
Structural Grade:	3
O&M Grade:	NA
Clock Start/From:	7
Clock To:	5
1st Value:	
2nd Value:	
Continuous Index:	F01
Within 8" of Joint:	False
Remarks:	



PACP Code:	AMH
Description:	Manhole
Distance (ft):	220.91
Structural Grade:	NA
O&M Grade:	NA
Clock Start/From:	
Clock To:	
1st Value:	
2nd Value:	
Continuous Index:	
Within 8" of Joint:	False
Remarks:	End of survey

CCTV Observation Report

Harris & Associates

Date:	Owner:	Pre Clean:
Pipe Length	Surveyor:	Shape:
Customer:	Weather:	Reach: 03-9007 to 03 - 9006

Street: Bear Mtn Blvd	Flow Control:	
City:	Dia/Height (in): 6in	
Use:	Material:	Survey Direction:
US Manhole: 03-9007	DS Manhole: 03-9006	Total Length Surveyed:

Position	Code	Observation	Video (sec)	Grade

* no CCTV or Report

Recommendation

- open trench pipe replacement

316.8

Appendix G: Southeast Kovacevich Park Pipeline Project Reference Materials

Southeast Kovacevich Park Pipeline Project Cost Estimate

Reach No.	Item	Action	Cost
Number	Reach		
1	04-8019_04-8018_12/2/2010_U	Spot Repair + Lining	$ 55,000.00
2	04-8018_04-8017_12/1/2010_U	Spot Repair + Lining	$ 36,000.00
3	04_8017_04_8016_9/14/2015_11:26	Replacement	$ 154,000.00
4	04-8016_04-8013_12/1/2010_D	Lining	$ 21,000.00
5	04_8015_04_8014_9/14/2015_11:26	Lining	$ 109,000.00
6	04_8014_04_8013_9/14/2015_11:26	Replacement	$ 67,000.00
7	04-8013_04-8008_12/1/2010_U	Replacement	$ 39,000.00
8	04_8009_04_8008_9/14/2015_11:26	Spot Repair + Lining	$ 44,000.00
9	04-8010_04-8008_12/1/2010_U	Replacement	$ 69,000.00
10	04-8012_04-8010_12/2/2010_U	Lining	$ 11,000.00
11	04-8011_04-8010_12/2/2010_U	Spot Repair + Lining	$ 15,000.00
12	04-8008_04-8003_12/1/2010_D	Replacement	$ 78,000.00
13	04-8004_04-8003_10/28/2009_U	Lining	$ 38,000.00
14	04-8005_04-8003_10/28/2009_D	Replacement	$ 29,000.00
15	04-8007_04-8005_12/2/2010_U	Spot Repair + Lining	$ 18,000.00
16	04-8006_04-8005_12/2/2010_U	Lining	$ 12,000.00
17	04-8008_04-8003_12/1/2010_D	Spot Repair + Lining	$ 78,000.00
18	04-8002_04-8001_10/28/2009_D	Replacement	$ 48,000.00
19	04-8001_04-0010_11/2/2009_D	Replacement	$ 36,000.00
20	04-7001_04-0010_10/28/2009_D	Spot Repair + Lining	$ 73,000.00
21	04-7002_04-7001_10/28/2009_U	Replacement	$ 71,000.00
	Manholes		
	04_8004	Repair	$ 2,000.00
	04_8009	Repair	$ 2,000.00
	04_8018	Repair	$ 2,000.00
	04_8001	Replace	$ 8,000.00
	04_8002	Replace	$ 8,000.00
	04_8003	Replace	$ 8,000.00
	04_8005	Replace	$ 8,000.00
	04_8010	Replace	$ 8,000.00
	04_8008	Replace	$ 8,000.00
	04_8014	Replace	$ 8,000.00
	04_8013	Replace	$ 8,000.00
	04_8016	Replace	$ 8,000.00
	04_8017	Replace	$ 8,000.00
	04_7002	Replace	$ 8,000.00
	04_7001	Replace	$ 8,000.00
	04_0010	Replace	$ 8,000.00
	04_018	Replace	$ 8,000.00

Total Construction Cost		$	1,219,000.00
Engineering & Construction Management	25%	$	305,000.00
Contingencies	20%	$	244,000.00
Administrative	5%	$	61,000.00
CIP Estimate		**$**	**1,829,000.00**

RedZone ROBOTICS

RedZone Solo Project
Profile and Photo Report

91 43rd Street
Pittsburgh, PA 15201
(412) 476-8980

Asset:

Pipe Segment	Upstream MH	Downstream MH	Material	Height	Width
04-8019 to 04-8018	04-8019	04-8018	Concrete Pipe (non-reinforced)	8	8
Shape	Sewer Use	Drainage Area	Lining Method	Total Length	Joint Length
Circular	Sanitary	NA		0	0
Pre-Cleaning	Clean Date	Flow Control	Purpose	Year Laid	Year Renewed
Jetting		Not Controlled	Not Known		

Location:

Street	City	Location	Details
North A St	City of Arvin	Main Highway - urban	

Inspection:

Surveyed By	Certificate No	Date	Time	Direction
JJC	U-907-5518	12/02/2010	11:23 AM	Upstream
Owner	Customer	Weather	PO Number	Length Surveyed
City of Arvin	Veolia	Dry		322
Media Label	Reverse Setup	Work Order No	Additional Info	
N523-1474	NO	-	Length unknown - Upstream manhole location unknown	

Results:

Overall Rating	Structural Rating	Maintenance Rating
295	230	65
Overall Index	Structural Index	Maintenance Index
2.73	2.99	2.1
Overall Quick	Structural Quick	Maintenance Quick
5143	433M	512E

- Large Sag at the beginning of the pipe that encompasses large fractures and cracks.
- further down the pipe line, water level is low, and walls and settlement seem to be the only concern

Recommendation

① Spot Repair from MH 04-8018 (J 21 - 60.5)

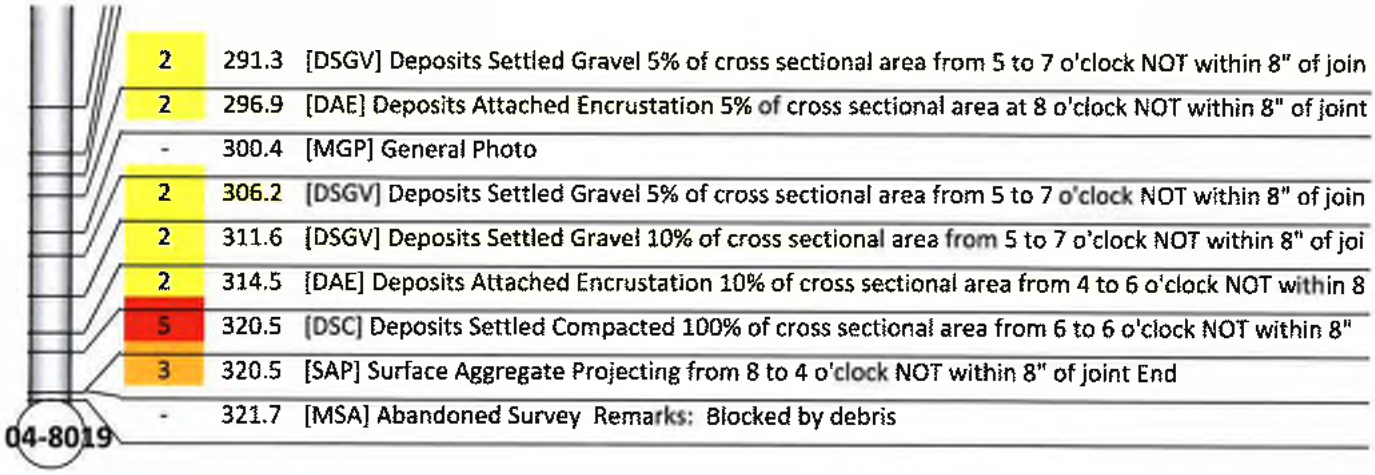
② CIPP entire length of pipe. (350)

04-8018

SR

Camera Direction

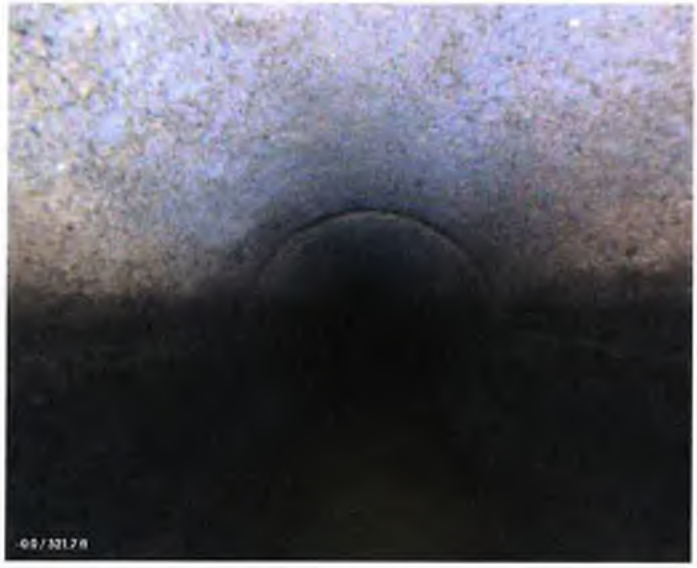
Grade	Dist (ft)	Observation
-	0	[AMH] Manhole Remarks: Begin survey
-	0	[MWL] Water Level 15% of cross sectional area
2	0.5	[FC] Fracture Circumferential from 8 to 4 o'clock NOT within 8" of joint
3	5.5	[SAP] Surface Aggregate Projecting from 8 to 4 o'clock NOT within 8" of joint Start
3	8.1	[FL] Fracture Longitudinal at 12 o'clock within 8" of joint
4	14.3	[FM] Fracture Multiple from 10 to 12 o'clock within 8" of joint J14 - 1517
2	15.9	[DAE] Deposits Attached Encrustation 5% of cross sectional area from 8 to 9 o'clock NOT within 8"
3	16.8	[FL] Fracture Longitudinal at 9 o'clock within 8" of joint J14 - 17 SR
4	18.8	[FM] Fracture Multiple from 8 to 4 o'clock within 8" of joint J17 - 19
-	25	[MWL] Water Level 40% of cross sectional area J21 - 60.5
-	31.8	[MWL] Water Level 50% of cross sectional area
2	38.9	[FC] Fracture Circumferential from 8 to 4 o'clock within 8" of joint
-	50	[MGP] General Photo
3	62.6	[CM] Crack Multiple from 8 to 4 o'clock within 8" of joint
-	63.1	[MWL] Water Level 25% of cross sectional area
3	63.4	[FL] Fracture Longitudinal at 1 o'clock within 8" of joint
2	75.6	[CL] Crack Longitudinal at 11 o'clock within 8" of joint
-	86.4	[MWL] Water Level 10% of cross sectional area
3	87.6	[FL] Fracture Longitudinal at 10 o'clock within 8" of joint
-	100.2	[MGP] General Photo
-	110.1	[TB] Tap Break-in at 3 o'clock
2	123.9	[CL] Crack Longitudinal at 12 o'clock within 8" of joint
-	125.8	[MWL] Water Level 25% of cross sectional area
-	133.3	[MWL] Water Level 10% of cross sectional area
4	141.7	[FM] Fracture Multiple from 9 to 3 o'clock within 8" of joint
-	150.1	[MGP] General Photo
2	151.6	[DSC] Deposits Settled Compacted 5% of cross sectional area at 6 o'clock NOT within 8" of joint Sta
2	167.4	[DSC] Deposits Settled Compacted 5% of cross sectional area at 6 o'clock NOT within 8" of joint En
-	168.3	[MMC] Material Change Remarks: Vitrified clay
2	169.6	[TFD] Tap Factory Defective at 9 o'clock NOT within 8" of joint Remarks: Fractures inside tap J168
3	170.7	[FL] Fracture Longitudinal at 11 o'clock within 8" of joint
-	170.9	[MMC] Material Change Remarks: Concrete
-	187	[MWL] Water Level 5% of cross sectional area (5%)
2	189.8	[DSF] Deposits Settled Fine 5% of cross sectional area from 5 to 7 o'clock NOT within 8" of joint Sta
3	194.8	[FL] Fracture Longitudinal at 11 o'clock within 8" of joint
-	200.4	[MGP] General Photo
-	250.8	[MGP] General Photo
2	278.3	[DSF] Deposits Settled Fine 5% of cross sectional area from 5 to 7 o'clock NOT within 8" of joint En
2	285	[DSGV] Deposits Settled Gravel 5% of cross sectional area from 5 to 7 o'clock within 8" of joint
2	288.3	[OBR] Obstacle Rocks 5% of cross sectional area at 7 o'clock NOT within 8" of joint



Condition Observations:

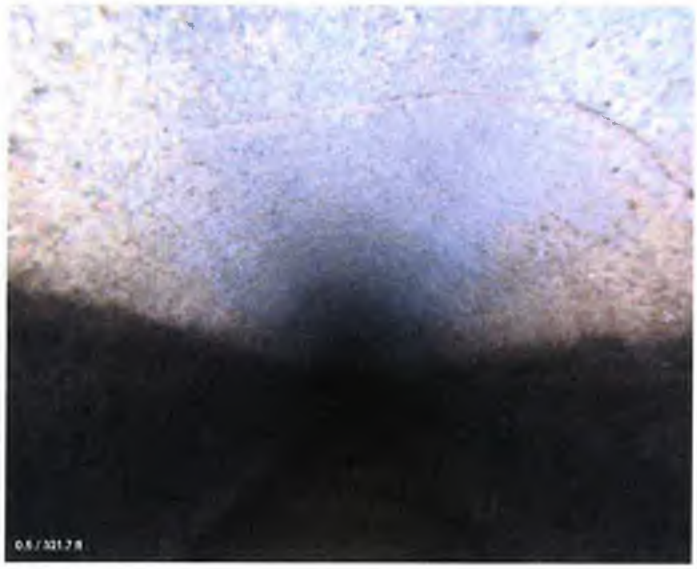
Grade	Dist (ft)	Observation		Description	Cont	Values 1st	Values 2nd	Values %	8" of Joint	Clock From	Clock To
-	0	AMH	Manhole	Remarks: Begin survey					☐		
-	0	MWL	Water Level	15% of cross sectional area				15	☐		
2	0.5	FC	Fracture Circumferential	from 8 to 4 o'clock NOT within 8" of joint					☐	8	4
3	5.5	SAP	Surface Aggregate Projecting	from 8 to 4 o'clock NOT within 8" of joint Start	S01				☐	8	4
3	8.1	FL	Fracture Longitudinal	at 12 o'clock within 8" of joint					☑	12	
4	14.3	FM	Fracture Multiple	from 10 to 12 o'clock within 8" of joint					☑	10	12
2	15.9	DAE	Deposits Attached Encrustation	5% of cross sectional area from 8 to 9 o'clock NOT within 8" of joint				5	☐	8	9
3	16.8	FL	Fracture Longitudinal	at 9 o'clock within 8" of joint					☑	9	
4	18.8	FM	Fracture Multiple	from 8 to 4 o'clock within 8" of joint					☑	8	4
-	25	MWL	Water Level	40% of cross sectional area				40	☐		
-	31.8	MWL	Water Level	50% of cross sectional area				50	☐		
2	38.9	FC	Fracture Circumferential	from 8 to 4 o'clock within 8" of joint					☑	8	4
-	50	MGP	General Photo						☐		
3	62.6	CM	Crack Multiple	from 8 to 4 o'clock within 8" of joint					☑	8	4
-	63.1	MWL	Water Level	25% of cross sectional area				25	☐		
3	63.4	FL	Fracture Longitudinal	at 1 o'clock within 8" of joint					☑	1	
2	75.6	CL	Crack Longitudinal	at 11 o'clock within 8" of joint					☑	11	
-	86.4	MWL	Water Level	10% of cross sectional area				10	☐		
3	87.6	FL	Fracture Longitudinal	at 10 o'clock within 8" of joint					☑	10	
-	100.2	MGP	General Photo						☐		
-	110.1	TB	Tap Break-in	at 3 o'clock		4			☐	3	
2	123.9	CL	Crack Longitudinal	at 12 o'clock within 8" of joint					☑	12	
-	125.8	MWL	Water Level	25% of cross sectional area				25	☐		
-	133.3	MWL	Water Level	10% of cross sectional area				10	☐		
4	141.7	FM	Fracture Multiple	from 9 to 3 o'clock within 8" of joint					☑	9	3
-	150.1	MGP	General Photo						☐		

2	151.6	DSC	Deposits Settled Compacted	5% of cross sectional area at 6 o'clock NOT within 8" of joint Start	S02			5	☐	6	
2	167.4	DSC	Deposits Settled Compacted	5% of cross sectional area at 6 o'clock NOT within 8" of joint End	F02			5	☐	6	
-	168.3	MMC	Material Change	Remarks: Vitrified clay					☐		
2	169.6	TFD	Tap Factory Defective	at 9 o'clock NOT within 8" of joint Remarks: Fractures inside tap		4			☐	9	
3	170.7	FL	Fracture Longitudinal	at 11 o'clock within 8" of joint					☑	11	
-	170.9	MMC	Material Change	Remarks: Concrete					☐		
-	187	MWL	Water Level	5% of cross sectional area				5	☐		
2	189.8	DSF	Deposits Settled Fine	5% of cross sectional area from 5 to 7 o'clock NOT within 8" of joint Start	S03			5	☐	5	7
3	194.8	FL	Fracture Longitudinal	at 11 o'clock within 8" of joint					☑	11	
-	200.4	MGP	General Photo						☐		
-	250.8	MGP	General Photo						☐		
2	278.3	DSF	Deposits Settled Fine	5% of cross sectional area from 5 to 7 o'clock NOT within 8" of joint End	F03			5	☐	5	7
2	285	DSGV	Deposits Settled Gravel	5% of cross sectional area from 5 to 7 o'clock within 8" of joint				5	☑	5	7
2	288.3	OBR	Obstacle Rocks	5% of cross sectional area at 7 o'clock NOT within 8" of joint				5	☐	7	
2	291.3	DSGV	Deposits Settled Gravel	5% of cross sectional area from 5 to 7 o'clock NOT within 8" of joint				5	☐	5	7
2	296.9	DAE	Deposits Attached Encrustation	5% of cross sectional area at 8 o'clock NOT within 8" of joint				5	☐	8	
-	300.4	MGP	General Photo						☐		
2	306.2	DSGV	Deposits Settled Gravel	5% of cross sectional area from 5 to 7 o'clock NOT within 8" of joint				5	☐	5	7
2	311.6	DSGV	Deposits Settled Gravel	10% of cross sectional area from 5 to 7 o'clock NOT within 8" of joint				10	☐	5	7
2	314.5	DAE	Deposits Attached Encrustation	10% of cross sectional area from 4 to 6 o'clock NOT within 8" of joint				10	☐	4	6
5	320.5	DSC	Deposits Settled Compacted	100% of cross sectional area from 6 to 6 o'clock NOT within 8" of joint				100	☐	6	6
3	320.5	SAP	Surface Aggregate Projecting	from 8 to 4 o'clock NOT within 8" of joint End	F01				☐	8	4
-	321.7	MSA	Abandoned Survey	Remarks: Blocked by debris					☐		

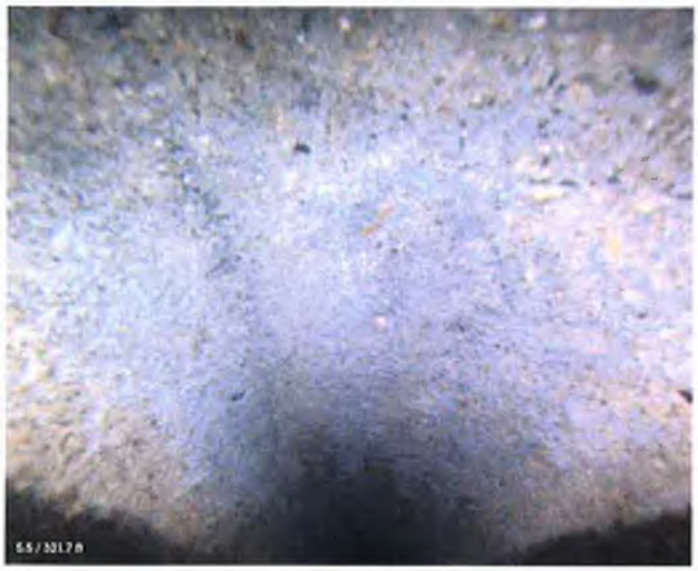


PACP Code:	**AMH**		
Description:	**Manhole**		
Image Name:	**53bda4de-dfba-449a-b5e5-b79eb36e9399_0-AMH.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Begin survey**		

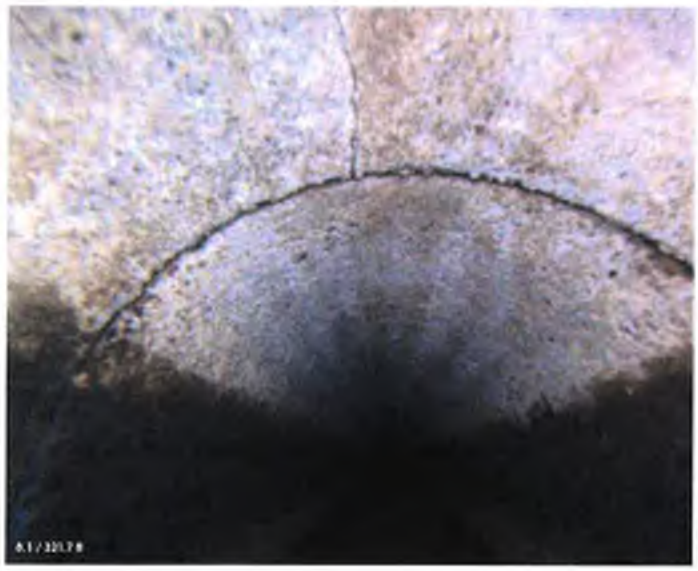
PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**49b5d4ce-422a-410e-9ac1-181346c70a0e_0-MWL.jpg**		
Distance (ft):	**0**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**15**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**FC**		
Description:	**Fracture Circumferential**		
Image Name:	**f2c1bb82-8ae0-4114-84b1-ba7dc6bb8b6d_0.5-FC.jpg**		
Distance (ft):	**0.5**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	SAP		
Description:	Surface Aggregate Projecting		
Image Name:	2046bcc9-bd1d-458c-b2f4-d0503192aa68_5.5-SAP.jpg		
Distance (ft):	5.5		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	8	Clock To:	4
1st Value:		2nd Value:	
Continuous Index:	S01	Within 8" of Joint:	☐
Remarks:			



PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	c8a0785a-abf2-46c4-b200-b8ca9b8f1de1_8.1-FL.jpg		
Distance (ft):	8.1		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	FM		
Description:	Fracture Multiple		
Image Name:	b11f8dc6-6b43-4f38-94a3-492607331095_14.3-FM.jpg		
Distance (ft):	14.3		
Structural Grade:	4	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	12
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	DAE		
Description:	**Deposits Attached Encrustation**		
Image Name:	**d5b18ae4-33e4-4131-9279-d75d9984f0b4_15.9-DAE.jpg**		
Distance (ft):	**15.9**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:	**5**		
Clock At/From:	**8**	Clock To:	**9**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**be9ea847-4c6e-4815-ac8d-9bb8d5022cfd_16.8-FL.jpg**		
Distance (ft):	**16.8**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

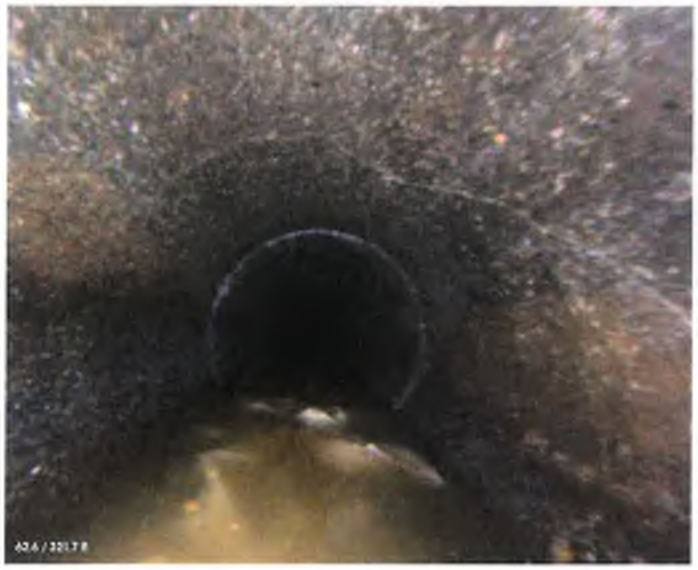
PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**6e05746e-9fcb-42a2-b287-09a6802ad9b7_18.8-FM.jpg**		
Distance (ft):	**18.8**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	e21b6513-38f5-4687-8b80-0acdd5d24984_25-MWL.jpg		
Distance (ft):	25		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	40		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

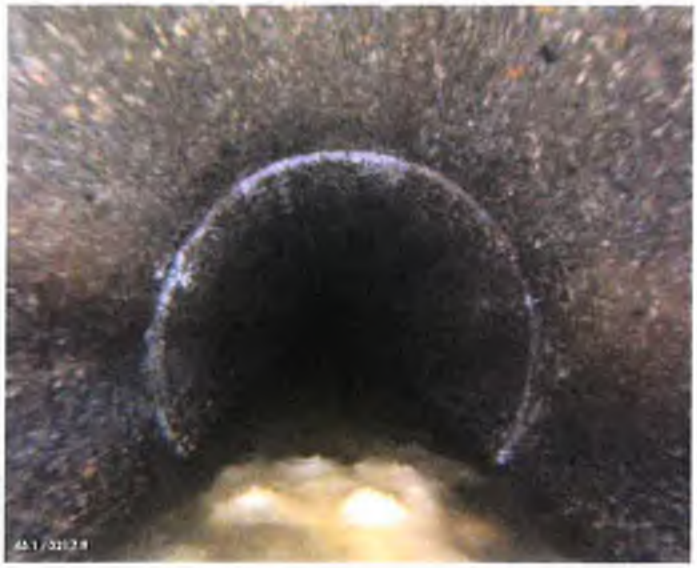
PACP Code:	MWL		
Description:	Water Level		
Image Name:	06e73616-c682-466c-8e2e-d9c8934e9f4a_31.8-MWL.jpg		
Distance (ft):	31.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	50		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FC		
Description:	Fracture Circumferential		
Image Name:	b61fbb2f-31bd-40a7-b95f-cadf36e7a715_38.9-FC.jpg		
Distance (ft):	38.9		
Structural Grade:	2	Maintenance Grade	0
Percent Value:			
Clock At/From:	8	Clock To:	4
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**8d8ecb19-6f34-4410-9834-dff4d03b86f6_50-MGP.jpg**		
Distance (ft):	**50**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**CM**		
Description:	**Crack Multiple**		
Image Name:	**785ee774-4f62-42c1-8351-03ee5d0740bf_62.6-CM.jpg**		
Distance (ft):	**62.6**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			



PACP Code:	**MWL**		
Description:	**Water Level**		
Image Name:	**ee4c47a3-6f26-4c12-a875-415da1e82314_63.1-MWL.jpg**		
Distance (ft):	**63.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**25**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	**Fracture Longitudinal**		
Image Name:	**1c006465-676c-4071-999c-4b7fcdd3252c_63.4-FL.jpg**		
Distance (ft):	**63.4**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**1**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

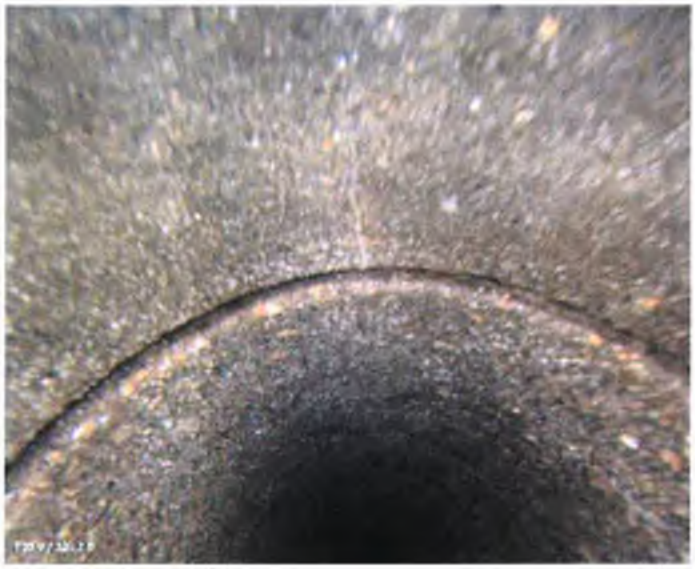
PACP Code:	CL		
Description:	**Crack Longitudinal**		
Image Name:	**0538d1a1-d156-4506-a259-669d059dca71_75.6-CL.jpg**		
Distance (ft):	**75.6**		
Structural Grade:	**2**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**11**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MWL		
Description:	**Water Level**		
Image Name:	**54cd1ee9-dc0f-40a0-b809-b4e8e48d7bc8_86.4-MWL.jpg**		
Distance (ft):	**86.4**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:	**10**		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	4d8e6c72-b428-4124-83de-9fc9b66ca8d9_87.6-FL.jpg		
Distance (ft):	87.6		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	10	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	290f55e1-270e-4864-9226-f39e542d77f9_100.2-MGP.jpg		
Distance (ft):	100.2		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	TB		
Description:	Tap Break-in		
Image Name:	e5a7eb98-4179-4007-9765-40feca05674c_110.1-TB.jpg		
Distance (ft):	110.1		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:	3	Clock To:	
1st Value:	4	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	CL		
Description:	Crack Longitudinal		
Image Name:	b225e48a-66e8-4bf1-821a-86dfbde5a4c8_123.9-CL.jpg		
Distance (ft):	123.9		
Structural Grade:	2	Maintenance Grade	0
Percent Value:			
Clock At/From:	12	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MWL		
Description:	Water Level		
Image Name:	1a6ab013-f0f5-4e5a-bde0-12491cc727bc_125.8-MWL.jpg		
Distance (ft):	125.8		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	25		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

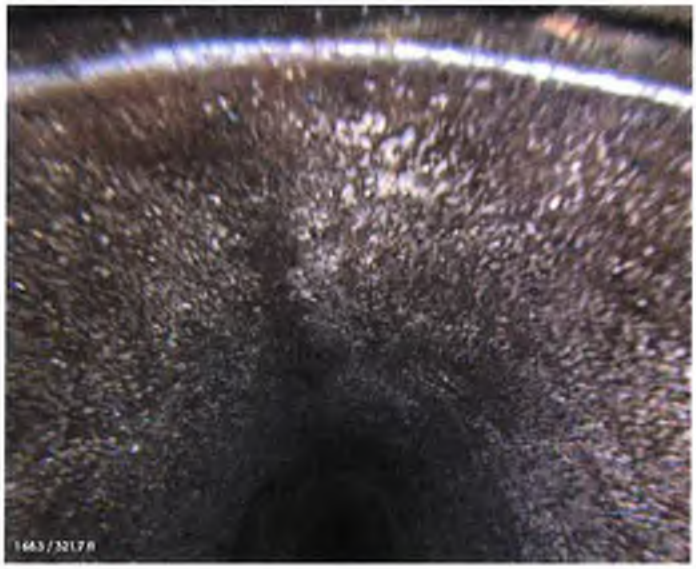
PACP Code:	MWL		
Description:	Water Level		
Image Name:	0d64a7ce-3752-4eba-a94d-6632df9987ca_133.3-MWL.jpg		
Distance (ft):	133.3		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	10		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	FM		
Description:	**Fracture Multiple**		
Image Name:	**5d428f03-3267-47fc-8ec1-9d90c1db1cec_141.7-FM.jpg**		
Distance (ft):	**141.7**		
Structural Grade:	**4**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**9**	Clock To:	**3**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	**General Photo**		
Image Name:	**0f516811-665e-4b5f-b739-318b8bb6eb03_150.1-MGP.jpg**		
Distance (ft):	**150.1**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

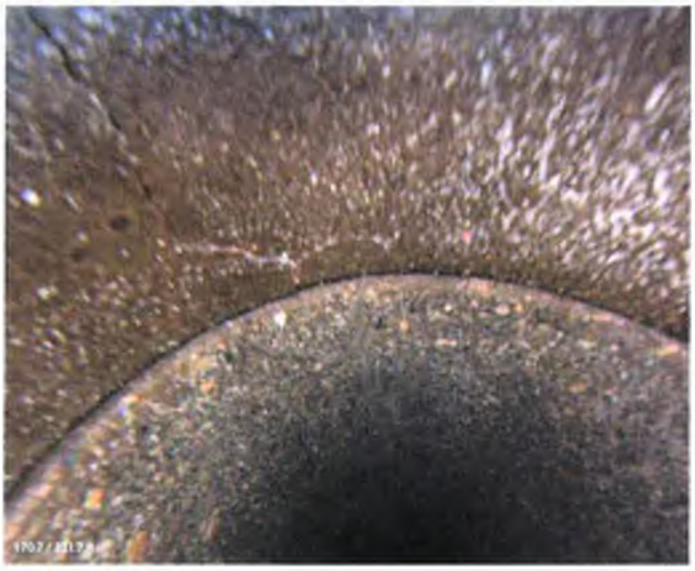
PACP Code:	DSC		
Description:	**Deposits Settled Compacted**		
Image Name:	**2f2acfcb-ffc0-495d-9464-6949b8821fe3_151.6-DSC.jpg**		
Distance (ft):	**151.6**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:	**5**		
Clock At/From:	**6**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:	**S02**	Within 8" of Joint:	☐
Remarks:			

PACP Code:	**DSC**		
Description:	**Deposits Settled Compacted**		
Image Name:	**9640204c-48ae-4db0-983f-a59b329cc52c_167.4-DSC.jpg**		
Distance (ft):	**167.4**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:	**5**		
Clock At/From:	**6**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:	**F02**	Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MMC**		
Description:	**Material Change**		
Image Name:	**ee3e1b3f-5c0d-485f-89e0-42b07f8b4109_168.3-MMC.jpg**		
Distance (ft):	**168.3**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Vitrified clay**		

PACP Code:	**TFD**		
Description:	**Tap Factory Defective**		
Image Name:	**d6d0bf2b-c2f4-4dd3-98b8-4519655e0dd7_169.6-TFD.jpg**		
Distance (ft):	**169.6**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:			
Clock At/From:	**9**	Clock To:	
1st Value:	**4**	2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Fractures inside tap**		



PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	1488aa10-c417-4b30-8d2f-7a2a3622733b_170.7-FL.jpg		
Distance (ft):	170.7		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MMC		
Description:	Material Change		
Image Name:	1a6177b5-bcf7-40bf-b6a2-6fa402bff7c3_170.9-MMC.jpg		
Distance (ft):	170.9		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	Concrete		

PACP Code:	MWL		
Description:	Water Level		
Image Name:	15abd39b-1a03-4231-a6fd-690ac1d9f151_187-MWL.jpg		
Distance (ft):	187		
Structural Grade:	0	Maintenance Grade	0
Percent Value:	5		
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	DSF		
Description:	Deposits Settled Fine		
Image Name:	c0be7c6e-cf54-42f0-a4f9-3145e9fea98b_189.8-DSF.jpg		
Distance (ft):	189.8		
Structural Grade:	0	Maintenance Grade	2
Percent Value:	5		
Clock At/From:	5	Clock To:	7
1st Value:		2nd Value:	
Continuous Index:	S03	Within 8" of Joint:	☐
Remarks:			

PACP Code:	FL		
Description:	Fracture Longitudinal		
Image Name:	e65f1ed1-261d-4073-88fc-d3f69352daac_194.8-FL.jpg		
Distance (ft):	194.8		
Structural Grade:	3	Maintenance Grade	0
Percent Value:			
Clock At/From:	11	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	03f7d8a0-111c-4daf-af77-bcac860f7640_200.4-MGP.jpg		
Distance (ft):	200.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**MGP**		
Description:	**General Photo**		
Image Name:	**83cf3dd1-0dab-427d-bc03-8169883abcfd_250.8-MGP.jpg**		
Distance (ft):	**250.8**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**DSF**		
Description:	**Deposits Settled Fine**		
Image Name:	**1f029c54-273d-4aeb-9031-e7ea03a5e012_278.3-DSF.jpg**		
Distance (ft):	**278.3**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:	**5**		
Clock At/From:	**5**	Clock To:	**7**
1st Value:		2nd Value:	
Continuous Index:	**F03**	Within 8" of Joint:	☐
Remarks:			

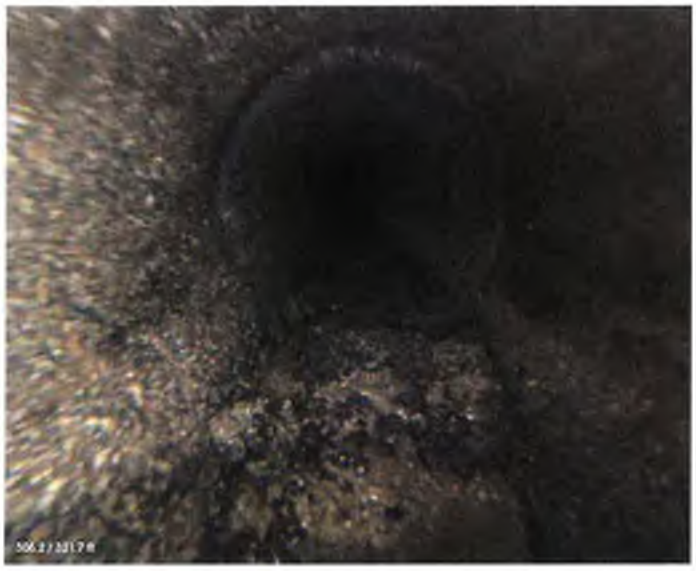
PACP Code:	**DSGV**		
Description:	**Deposits Settled Gravel**		
Image Name:	**5128c41c-fe36-4c64-9213-ea65a7639e36_285-DSGV.jpg**		
Distance (ft):	**285**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:	**5**		
Clock At/From:	**5**	Clock To:	**7**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☑
Remarks:			

PACP Code:	**OBR**		
Description:	**Obstacle Rocks**		
Image Name:	**08eaca24-05f1-4690-9849-dbaea71a6f03_288.3-OBR.jpg**		
Distance (ft):	**288.3**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:	**5**		
Clock At/From:	**7**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**DSGV**		
Description:	**Deposits Settled Gravel**		
Image Name:	**3d1a6b44-d0bd-417e-96ae-151298b8e96d_291.3-DSGV.jpg**		
Distance (ft):	**291.3**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:	**5**		
Clock At/From:	**5**	Clock To:	**7**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**DAE**		
Description:	**Deposits Attached Encrustation**		
Image Name:	**507feeb6-0c2c-4c7d-ad5c-d5c50634564f_296.9-DAE.jpg**		
Distance (ft):	**296.9**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:	**5**		
Clock At/From:	**8**	Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	MGP		
Description:	General Photo		
Image Name:	d89407de-1093-485f-9aa8-40509274db63_300.4-MGP.jpg		
Distance (ft):	300.4		
Structural Grade:	0	Maintenance Grade	0
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

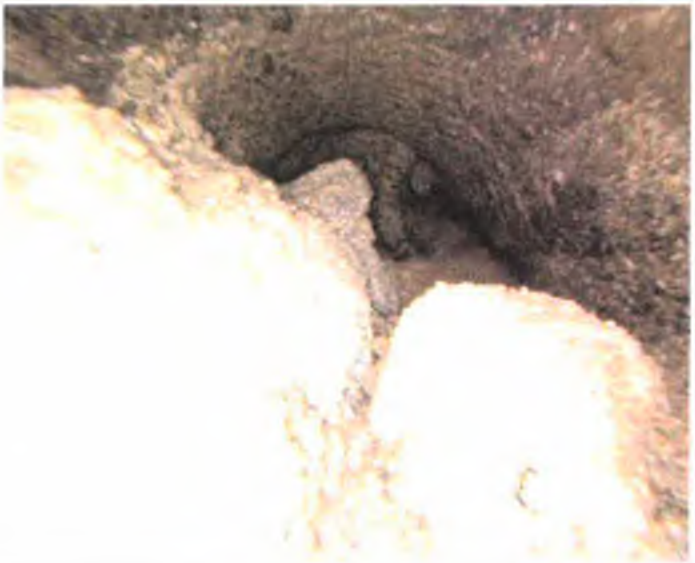


PACP Code:	DSGV		
Description:	Deposits Settled Gravel		
Image Name:	64b93a60-6cea-418e-85e8-e7196155ee1b_306.2-DSGV.jpg		
Distance (ft):	306.2		
Structural Grade:	0	Maintenance Grade	2
Percent Value:	5		
Clock At/From:	5	Clock To:	7
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

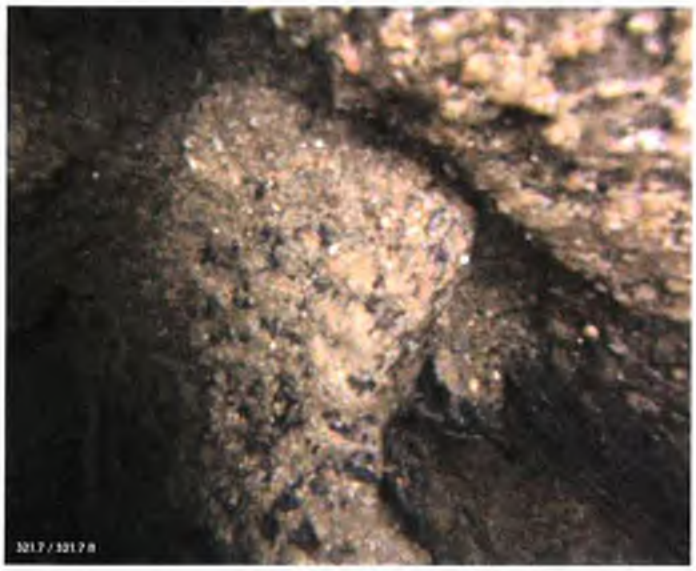
PACP Code:	DSGV		
Description:	Deposits Settled Gravel		
Image Name:	d321db7a-3a61-4ab1-91a9-d7a8b37c0605_311.6-DSGV.jpg		
Distance (ft):	311.6		
Structural Grade:	0	Maintenance Grade	2
Percent Value:	10		
Clock At/From:	5	Clock To:	7
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**DAE**		
Description:	**Deposits Attached Encrustation**		
Image Name:	**f6ec0f58-89cd-4774-8974-379502d57b23_314.5-DAE.jpg**		
Distance (ft):	**314.5**		
Structural Grade:	**0**	Maintenance Grade	**2**
Percent Value:	**10**		
Clock At/From:	**4**	Clock To:	**6**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			

PACP Code:	**DSC**		
Description:	**Deposits Settled Compacted**		
Image Name:	**6f2b16c5-ad4d-41ef-9f9e-4a49b8ab3953_320.5-DSC.jpg**		
Distance (ft):	**320.5**		
Structural Grade:	**0**	Maintenance Grade	**5**
Percent Value:	**100**		
Clock At/From:	**6**	Clock To:	**6**
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:			



PACP Code:	**SAP**		
Description:	**Surface Aggregate Projecting**		
Image Name:	**9d05244b-3c95-46f1-a364-326a0d0b036a_320.5-SAP.jpg**		
Distance (ft):	**320.5**		
Structural Grade:	**3**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:	**8**	Clock To:	**4**
1st Value:		2nd Value:	
Continuous Index:	**F01**	Within 8" of Joint:	☐
Remarks:			



PACP Code:	**MSA**		
Description:	**Abandoned Survey**		
Image Name:	**e68d74d1-c724-4205-9da7-95057f861de3_321.7-MSA.jpg**		
Distance (ft):	**321.7**		
Structural Grade:	**0**	Maintenance Grade	**0**
Percent Value:			
Clock At/From:		Clock To:	
1st Value:		2nd Value:	
Continuous Index:		Within 8" of Joint:	☐
Remarks:	**Blocked by debris**		